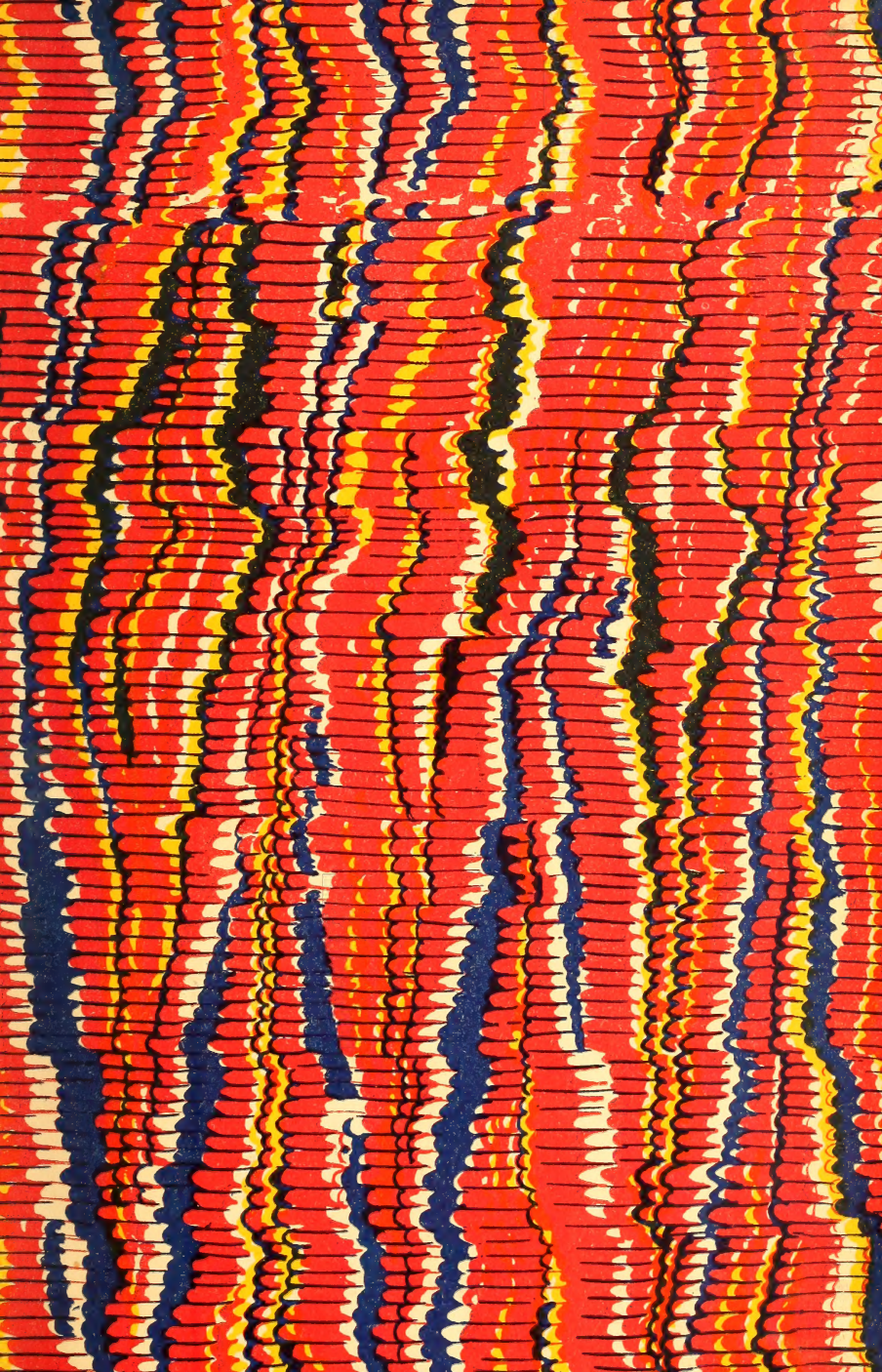






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EDITED BY

F. W. STANSFIELD, M.D.

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March, 1919.



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F. W. STANSFIELD, M.D.

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(Hon. Sec. and Hon. Treasurer, W. B. Cranfield, East Lodge, Enfield Chase,
Middlesex).

KENDAL, WESTMORLAND.

THE BRITISH FERN GAZETTE.

NEW SERIES.

VOL. 4.

MARCH, 1919.

No. 1.

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EDITORIAL NOTES.

The war being now practically over, the GAZETTE awakes from its temporary sleep, and, although it may be somewhat enfeebled by lack of sustenance, it is hoped that it may soon regain its former vigour.

Since our last issue the Society has lost, by death, Mr. C. B. Green, of Swanage, formerly of Acton. Mr. Green was a frequent contributor to the GAZETTE, a very good general botanist, and an enthusiastic lover and cultivator of British Ferns. He it was who made possible the raising of the *gracillimum* strain of *P. aculeatum* by the production of spores on the parent *pulcherrimum*. This was not the first appearance of spores on this variety, but it was the first time they had appeared in "paying quantities." Mr. Green himself raised *P. acul. pulcherrimum plumosum*, Green, which we regard as the best thing raised from this source, and certainly one of the finest of British Ferns.

Our Hon. Secretary has also suffered a heavy bereavement in the loss of his wife in September last, after only a few months of married life. Our warmest sympathies, and those of our readers, will go to Mr. Cranfield in his sad loss.

Notwithstanding the extreme importance of food production from the land during the war, the British fern cult has not been allowed to die out, and it is hoped that those members who are in possession of rare and unique varieties will continue to tend and preserve them until they can be more widely distributed. The Editor has been perforce compelled, by extreme pressure of work, to neglect his garden to some extent, but, although some ferns have suffered, nothing has been absolutely lost with the possible exception of that extremely rare fern *Asplenium lanceolatum microdon*, which was killed outright by the severe frost of the winter of 1916-17. A frond, which apparently bore a few spores, had, however, been preserved from 1916. These spores were sown in the autumn of 1917, and a sparse crop of healthy prothalli resulted. A few of these have produced fronds and, though there are many strays among them and none are yet recognisable as *lanceolatum*s, we are not without hope that *microdon* may yet appear among them. Should this prove to be the case the plants will not only be valuable as preserving the race of a rare and almost extinct fern, but will be strong, though perhaps not quite conclusive, evidence against the theory of hybrid origin for this variety, which view was strongly maintained by the late Mr. E. J. Lowe, and believed by many other competent authorities. On the other hand, should the seedlings prove to be variable (apart from the question of strays) they may not only support the theory of hybridity, but may also throw light on the quite distinct question as to what was the parent other than *lanceolatum*. Should, however, the seedlings be all "strays" (i.e., include nothing which can be traced to *microdon*) the sowing will have proved nothing—not even the barrenness of *microdon*, although this has long been taken for granted. The experiment may be repeated, not

only with *lanceolatum microdon* (should anyone be so fortunate as to have spores), but also with *A. ad. nigrum microdon* and *A. trichomanes confluens*, both of which have also been held, upon somewhat insufficient grounds, to be hybrids, the "Gay Lothario" in all three cases being supposed to be *A. marinum*. It is desirable that this slur upon the character of an apparently respectable fern should either be substantiated in full court or else withdrawn for lack of evidence. It is certainly "not proven." The Editor will be obliged to any member or friend who can send him spores of either *A. lanceolatum microdon* or *A. Ad. nigrum microdon* for further experiments. Neither of these ferns, *as a rule*, produces perfect spores, but occasionally in well-grown examples a very few isolated black sporangia may be observed on the margins of the otherwise abortive sori. Apropos of hybrid ferns, Mr. W. Wilson, of Kendal, reports that he has found a plant intermediate in character between *Asplenium trichomanes* and *A. viride*. The fern was found in Levens Park, and was surrounded by many plants of *A. trichomanes* and *A. ruta-muraria*, but *A. viride* was not found near. The fronds had black stems for an inch from the caudex and thence green to the tips, which latter were not confluent. Unfortunately the plant died. Spores were sown, but only a few prothalli developed, and these were very feeble and miffy. Up to the present only one plant has been produced, and this resembles *trichomanes*, and may, of course, be a stray. It is to be hoped that others will appear which may reproduce, more or less, the character of the parent. A supposed *trichomanes* $\times$ *viride* hybrid has been recorded on the Continent under the name of *A. adulterinum* (Milde). "It resembles *A. viride* in the texture of the fronds, which is softer than in *A. trichomanes*, and also in the absence of any wing to the rachis, while its

relationship to *A. trichomanes* is shown in the placing of the sori (nearer to the margin than in *viride*), and also in the colour of the greater portion of the rachis, which is dark brown or black, although in the upper portion it becomes green, showing that the mixture of the two species has been very complete." (Britten's European Ferns.)

Mr. Relton, of Whitechurch, Herefordshire, records what appears to be a new find of an old variety, viz. : *Asplenium trichomanes subæquale* (Moore). This was recorded by Moore in his "Nature-printed British Ferns," published in 1855, as having been found by Mr. J. D. Enys in the valley of the Wye. The name is founded on the fact that "the pinnae are attached to the rachis near their centre, and not by the inferior angle." Moore attached great importance to this character, only casually alluding to the other features of dentate margin and imbrication of the lower pinnae, which appeal much more strongly to the fern-loving cultivator. Were the fern a new find we should prefer the name *sub-imbricatum*, especially as the *subæquale* character is neither perfectly constant in this variety nor peculiar to it. The plant is somewhat variable in all its characters, but is decidedly striking when in good form, and well worth growing, especially when one considers the small number of varieties of this pretty species. Mr. Relton has found it in two places in the Wye Valley, and it is probable that it has persisted in that locality since the original finding of more than sixty years ago.

A VISIT TO MESSRS. PERRY'S NURSERY, ENFIELD.

A small party of members recently paid a visit to this "plant farm." Messrs. Perry are well-known and highly successful growers of hardy flowering plants, but have only

comparatively recently taken up British Ferns seriously, the nucleus of the stock being, we understand, the Buster collection. It has, however, been largely reinforced from other sources, and large numbers of ferns, of many varieties, have been raised from spores. As usually happens in such cases, many intermediate forms have appeared, but there are good stocks of choice varieties quite true to name and in good health, notwithstanding the scarcity of labour during the war, which has affected this nursery in common with all others in the country. Among other good things noticed were *P. acul. pulcherrimum* and *P. a. gracillimum*, *P. angulare stipulatum* and other choice divisilobes, *P. ang. latifolium*, Moly, now rather scarce, *P. grandiceps*, Moly, with *Athyriums*, *Lastreas* and *Scolopendriums* in great variety. The gem of the place, so far as ferns are concerned, and the chief object of our visit was, however, *P. ang. divisilobum plumosum superbum* (Perry). It is a very dense variety resembling Esplan's form, but the upturned ultimate segments give it a more mossy look. The fronds and pinnæ are also somewhat rounder and blunter than in "Esplan." Messrs. Perry have obtained spores from the plant, and thousands of seedlings have been raised, which appear to have come perfectly true to name, so that a large stock will soon be available. Although we are not quite prepared to admit the claim (implied in the name *superbum*) that this form beats the record in this section, it is undoubtedly one in the very first rank, and Messrs. Perry are to be congratulated upon a notable hit in raising it, and, perhaps still more, on its very successful propagation. Since the above was written we have learned with regret that Messrs. Perry's nursery has been damaged by a destructive fire, but we understand that the ferns have not been injured.

BLECHNUM SPICANT SERRATUM, HENWOOD.

As previously announced in the GAZETTE (September, 1917), this fern was found as a small plant by Mr. Charles Henwood on a wall in Bucks in 1916. It has now grown into a strong specimen and proves to be one of the finest *Blechnums* ever found wild. Although very near to the best types of Airey's *B. s. serratum* No. 2 (which was, however, not found wild but raised), it differs from that variety in the broader and rounder character of the ultimate divisions of the barren fronds; these tend somewhat to overlap each other and thus give the frond a very handsome foliose appearance. In the fertile fronds the lobes are also rounder than in Airey's variety, and are, indeed, rather crenations than serrations. The plant is a good grower, and one of the most decorative forms of the species. Mr. Henwood is to be heartily congratulated upon its discovery. We had hoped to give a portrait of this fern as a frontispiece to the present issue, but the necessity for economy forbids the continuance of this feature for the present. It is hoped that it may soon be possible to revive it, but this must depend upon the relation between income and expenditure in the Society. Members can help by the prompt payment of subscriptions, which are due in advance, and should be sent to Mr. W. B. Cranfield (Hon. Secretary), East Lodge, Enfield Chase, Middlesex. Literary and other contributions to the GAZETTE should be sent to Dr. Stansfield, 120 Oxford Road, Reading.

OTIORHYNCHUS DEVASTATOR (SULCATUS.)

From the very inception of the hardy fern cult, some three-quarters of a century ago, *Otiorhynchus devastator* (the fern beetle) has held premier position for "sheer cussedness" among our fern enemies, with *Aleyrodes vapor-*

aria (the fern fly) as a good second. We have many other fern enemies, notably *Tortrix costana*, but the fern beetle has occasioned more heartaches among fern lovers than all other pests combined. To such an extent did this beetle formerly menace our ferns, that no plant was reasonably safe unless it was isolated by being placed on an inverted pot standing in a saucer of water. Like the witches of old, these beetles are unable to cross water, and are the greatest bunglers in the natatory art of any creatures living. They drown in an incredibly short time, and, if once they get in water, seldom succeed in regaining terra firma. Quite a large slice of the writer's moderately long life having been spent in mortal combat with the fern beetle, he can say with Macbeth :

- “ You both know Banquo was your enemy.
 So is he mine ; and in such bloody distance,
 That every moment of his being, thrusts
 Against my nearest life.”
- “ But I will put that business in your bosoms,
 Whose execution takes your enemy off ;
 Grapples you to the heart and love of us,
 Who wear our health but sickly in his life,
 Which in his death were perfect.”

The fern beetle cannot be destroyed by fumigation either when in the larval or the perfect insect stage, but if the ferns are systematically sprayed once a week with “ Abol ” at about half the regulation or killing strength, the beetles will evacuate the premises without further parley. There appears to be some constituent of this insecticide which is anathema to the fern beetle. The dread sentence of perpetual banishment appears to be less objectionable than the taste or smell of “ Abol ”-scented foliage to these creatures. *Osmundas*, *Adiantums*, *P. dryopteris*, *L. the-*

lypteris, and a few other ferns with soft velvety foliage are injured by "Abol," but 90 per cent. of our hardy ferns do not object to dilute "Abol."

This insecticide has also a deterrent effect on the fern fly, which can be kept in check by bi-weekly sprayings.

Tortrix costana (an awful pest when in full possession) can be exterminated by daily sprayings when the perfect insect is on the wing. The smell is insufficient in this case to banish the moths, but actual contact destroys them.

H. STANSFIELD.

The well-known "Abol" is undoubtedly an excellent insecticide, and almost indispensable to the fern grower, especially out of doors, where fumigation is impracticable. It immediately destroys any green-fly with which it comes in contact, as well as the larvæ of that disfiguring pest, the white "fern-fly." This creature should be attacked as soon as the larvæ are discovered, since as soon as these reach the winged state they fly away on the application of any insecticide and return as soon as its pungency has subsided. The pungency of "Abol" seems to be due to a certain amount of free ammonia, which, of course, quickly evaporates. We have also had recommended as an excellent plant wash a solution in water of soft soap of the strength of two ounces to the gallon, to which is added one drachm (60 drops) of pure nicotine. We have not yet made a practical trial of this solution, but should expect it to act well as a cure and deterrent for the "white-fly." The nicotine is not volatile like ammonia, and may be expected to remain upon the foliage for some time. It is, of course, very poisonous, and should not be "left about" in solution.—EDITOR.]

FERN CULTURE:—SOME FAILURES; SOME SUCCESSES.

No member of our Society is likely to need hints upon the cultivation of his ferns as does the amateur who purchases a Gardening Paper to ascertain which end of a cutting he should insert, or when he is to put in a bulb. But Mr. Stansfield's article in the March issue (1918), followed by Mr. Green's in the June issue, have been interesting and valuable from the very divergence of their standpoints ; and it seems likely that, if a representative number of our members could be induced to set down their experience, we should all learn much about the variety of conditions under which ferns can be grown ; some of us might find that we could safely dispense with various details of culture which we had been taught to consider necessary ; many would be encouraged to extend their hobby in directions hitherto shunned, or unexplored.

The things which seem to me of importance are *aspect*, *shelter*, *drainage*, and *moisture*. With the possible exception of moisture, which involves more than watering, these requisites can be provided by anyone, anywhere—herein lies the encouragement of our cult.

The sovereign importance of *aspect* was burnt in upon me by a signal failure. I wanted to have native ferns in front of one of my greenhouses. The greenhouse faced nearly South. This was a difficulty, but I expected to be able to overcome it by raising the ground on the side furthest from the house, and so causing it to slope Northwards. I did more : I raised a rough wall some two and a half feet at the outer edge of the bed, and with its help both exaggerated the slope and lessened the effect of the sun. The result was failure complete and absolute. The ferns not only would not flourish, they would not even exist. I suspect

that the refraction of the sun's rays from the front of the house must have contributed to the catastrophe : the ferns would probably have lived if the house had been removed. But the experience made it plain that for success *aspect* was of high importance. In any ferneries made since, I have chosen aspects which looked either to the North or the East.

That ferns must be *sheltered* from wind, and prefer being sheltered from sun, comes home to everyone who notes the natural sites in which they flourish most. There are some apparent exceptions, such as *Polypodium vulgare*, which contrives to live even on the wind-swept sun-scorched tops of walls. Even the exception, however, is apparent rather than real, for the *Polypodium* of the wall is as different from his cousin of the dell, as is the half-starved pony of the mountain from his sleek brother in the stall.

To quick *drainage* I attach very great importance. Occasionally I have thought that a pot specimen did better when the water percolated slowly. I should not, however, like to press this opinion, and in all my out-door planting special precautions are taken for good drainage. This was impressed upon me by another failure. Wishing to decorate a well-sheltered but flat opening in a shrubbery, I filled it with *Polystichums* and *Lastreas*, healthy divisions of the usual crested and fingered types. Some of them dwindled away ; none of them flourished. That ferns will grow well when the ground is flat, is certain ; but for success, either special preparation, such as Mr. Stansfield's article describes, is necessary, or else the soil must be naturally well drained. As mine is heavy, and drains very slowly, I have learned to counteract its defects by throwing up mounds and planting on their side ; if for any reason, such as complete shelter, or decorative effect, I want to have my specimen low, the difficulty is surmounted by deep digging and a French drain.

Moisture, as has been said, implies much more than watering. Except when ferns are newly planted, the artificial watering pot is not used in my ferneries. This, no doubt, is largely due to the comparative moisture of our climate, but even in dry places a good deal can be done to retard evaporation, and thus produce the moist atmosphere in which ferns luxuriate. My plan is to intersect the ferneries with hedges of ornamental shrubs, Veronicas, Eucryphias, Spiræas, &c. By their help the ferns are kept from sun, and damp is encouraged both under and above ground.

It will have been noticed that in enumerating the chief requisites for the successful growth of ferns, nothing was said about soil. This was deliberate, for my belief is that, if all else is right, it matters little about the soil. My experience had long pointed in this direction; it was finally confirmed by an experiment which I shall describe. For some seasons we had been improving the kitchen garden by digging up the yellow clay, where it came too near the surface. The excavated clay was thrown in an unused corner which faced North and East. After a while atmospheric action told, and the clay began to grow rank weeds. Then occurred the thought, why should it not grow ferns? As time permitted, the heap was shaped into miniature ranges of hills and sheltered valleys; the valleys were drained, and shrubs were put along the highest parts of the ridges. Then the ferns were planted, somewhat nervously at first, but afterwards with more confidence. In the case of the more important specimens, holes the size of a large flower pot were filled with a sandy maiden loam, perhaps the best of all mediums, when selection is possible; the only other assistance given was a top dressing of burnt garden refuse. The result has been uniform and complete

success ; no difference is to be observed between the specimens put in with maiden loam and those planted in what had been yellow clay. The whole makes at once the most interesting and most luxuriant of my half-dozen ferneries.

It is never wise to deduce rules from limited experiments, and therefore I must not be understood as *recommending* my friends to plant in yellow clay, but I am quite prepared to maintain that no one need deny himself a fernery because he cannot command the luxury of leaf mould or sandy loam. As for the rest, I accept the rules which prescribe the lightest of composts for Polypodiums, and I comply with the suggestion that both Scolopendriums and Polypodiums like lime ; I suspect, however, that neither of them *require* it. The only other general rule of which I am aware in this connection is that Blechnums abhor lime. Whether it is because I cannot eliminate the lime, or whatever be the cause, the poor success I have had with this fern leads to the conclusion that Blechnums abhor me.

H. KINGSMILL MOORE, D.D.

WORK FOR THE SPRING.

The months of March and April are a busy time for the gardener in general, and not less so for the fern grower than for the cultivator of other specialities. It is also a most interesting time, inasmuch as the period of greatest activity is at hand. It is necessary to examine into the results of winter storms and frosts—some ferns may have been disturbed or partially uprooted, and these should be made firm and replanted, or top-dressed with fresh material. Bulbils should be pegged down in fresh fibrous soil in which they will soon begin to make roots. A small bell-glass as a covering is a great help to the bulbil just commencing an

independent life, and it is well worth while to give it in the case of rare and valuable varieties. It is well too to look over the collection and see that the plants are not overcrowded, since the new fronds will often be double the length of those of the previous year, and, consequently, ferns which had plenty of room last year may be crowded as soon as the new fronds are developed. The wise grower will attend to this before growth begins, and give more room where necessary, since it is injudicious to disturb ferns when in full growth. The early spring is probably the best time for dividing and replanting deciduous ferns such as *Athyrium*s and *L. Montana*, although for the evergreen species we prefer the early autumn, when growth has nearly ceased. Ferns which have become masses of small crowns may be pulled to pieces, and will gain greatly by the process. The small crowns, some of them perhaps with few or no roots, will require a little extra protection and coddling until they have become established. In the case of ferns under glass, whether in pots or planted out, but especially the former, it is necessary to see that they do not suffer from lack of moisture. Since no fronds are being produced, one is apt to imagine that the plants are at rest. This is, however, far from being the case: the roots are actively at work and, in the case of evergreen species, abundant evaporation takes place from the old fronds. During March, ferns which are apparently dormant will often be found to be dry at the roots unless carefully watched. Drought at this season is, of course, fatal to the beauty and vigour of the new fronds, and may even result in the death of valuable plants. As March is the time for thinning and getting rid of surplus stock, it is also the best time for the acquisition of new varieties, as the ferns can be immediately placed in their permanent quarters and will make their new growth

without a check. Newly-planted ferns, however, require to be carefully watched and protected from drying winds until thoroughly established. Contrary to the experience of the flower and vegetable grower, the spring is *not* the time for sowing spores of ferns. These should be sown in the early autumn or late summer, *i.e.*, as soon as possible after they are ripe. A sharp look-out should now be kept for the earliest appearance of the larvæ of the green and white fly, which can often be found on the old fronds before the new ones appear. As soon as *one* of these creatures is seen the house or frame should be fumigated, or, if the ferns are in the open air, they should be thoroughly syringed with some suitable insecticide. Much trouble and disfigurement of the ferns will thus be avoided by prompt action.

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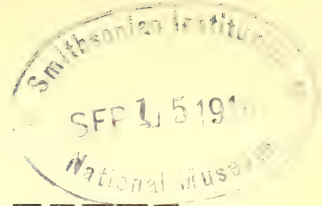
F. W. STANSFIELD, M.D.

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THE BRITISH FERN GAZETTE.

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THE ABANDONMENT OF THE GENERAL MEETING.

The Members will regret that (as already intimated by a circular) owing to the impossibility of obtaining accommodation and the restrictions on Railway travel, it has been decided to postpone the Annual Meeting and Excursion to Wales until next year. A proposal that the meeting should be held at Kendal or Windermere was likewise found to be impracticable.

The President, Officers and Committee have consented to act for another year.

Two new features appear in the current number—a Column for Beginners and a Column for Members desiring to Exchange their varieties. It is hoped that Members will take advantage of these facilities.

Members are reminded that the subscriptions are payable in advance. The increased cost of the Gazette practically absorbs the available funds. Members are therefore urged to pay their arrears and the current year's subscriptions at their earliest convenience.

POLYSTICHUM ANGULARE FOLIOSUM GRANDE.

This is an exceedingly fine thing. Unlike most foliose ferns it is thick and solid in texture and the pinnules are beset with sharp points so as to present quite a prickly appearance. It is, however, a true *angulare* and has nothing of the glossy surface and hard texture of *P. aculeatum*. It was raised by Mr. J. W. Walton, of Richmond, from spores received from Mr. Wiper, of Kendal. From internal evidence we think the parent was probably *P. a. crispato-foliosum* (Parsons), the character of which it shows in an enhanced degree. Its one fault (so far as the seedlings are concerned at all events) is an apparently incurable tendency to split up into a number of coalescing crowns, so that it is difficult to obtain a symmetrical plant. A good "shuttlecock" would make a grand specimen either for the garden or the exhibition table. There is no nonsense about not finishing its fronds with this plant, and it is quite capable of holding its own in the open air.

A NEW STRAIN OF P. ANGULARE PLUMOSUM.

About 1910 Mr. H. Stansfield sent me a very beautiful seedling *Polystichum angulare*, which was believed to have come from a foliose form of the Jones-Fox strain. There

was nothing of the *acutilobum* or *divisilobum* character about it, but it was a pure *plumosum* with very slender and finely cut segments, far surpassing in this respect any other plumose form of the species. Unfortunately, the plant was damaged in transit and it was not until the following year that it recovered its health. It proved to be a vigorous grower and grew to a larger size than any other plumose form and very soon outgrew my scanty glass accommodation. While under glass it was greatly admired for its light and feathery grace. When first seen by a good judge it was at first taken for a plumose form of *Athyrium*, but it was soon seen to have a sharpness of finish not to be found in any *Athyrium* except, perhaps, *A. f.f. Kalothrix*. On account of its lax expanded growth it was named *plumosum rarefactum*, but upon being removed to the open air it became less diffuse in habit while retaining all its exquisite refinement of cutting. It appeared, for some time, to be entirely barren, but in 1913 one pinna produced a few sori, the spores from which were sown in August of that year. A large crop of seedlings resulted and among them a sprinkling of "curly-wigs," i.e., young fronds fringed with prothalli, or rather consisting of prothallial tissue on short stalks. These were selected and carefully pricked out in sterilized soil late in the autumn of 1914. They proved, as these prothallial ferns generally do, to be of very slow growth and, in the heart of the winter, a crop of moulds appeared which threatened to destroy the lot. They were watered with what was supposed to be a solution of potassium permanganate, but by an unfortunate error it was "XL all" solution, which killed not only the mould but all the seedling ferns it touched—about half the crop and possibly the better half. The remainder, some dozen or twenty plants, survived

and grew up at a very slow rate and with an incredible amount of care and coddling. Of course, a little artificial heat would have saved years of waiting, but during the war this was not available. The seedlings turned out to be a very mixed lot—not a mixture of good and bad, however, for there was not a bad one among them—but of exceedingly varied character consisting of pure *plumosums*, *plumosums* of an exaggerated rarefactum type, plumose divisilobes, and *pulcherrimums*. The winter of 1916-17 killed two of them (and, of course, two of the best, both exceedingly fine plumose divisilobes with prothallial tips) although they were cared for like babies. The survivors are now some twelve plants, no two of which are exactly alike but comprising:—

- (i) Five *pulcherrimums* of first-rate type, true all through with exquisite cutting and falcate pinnules.
- (ii) Three exaggerated *rarefactums*, i.e., plants with *pulcherrimum* cutting but without the falcate pinnules of true *pulcherrimums*.
- (iii) Three plumose divisilobes, one of *pellucidum* type and two which bid fair to surpass *Baldwinii* in delicacy of finish.
- (iv) One plant, still small, which seems to combine the characters of *plumoso-divisilobum* and *pulcherrimum*. This plant was the picture of health in the autumn of 1918. It was potted and sheltered in a cold house for safety during the winter. It remained healthy and lovely through most of the winter, but with the approach of spring and east winds, seemed to shrink up and wither like a delicate child, and was unable to complete a single frond. It was planted out in a frame and covered with a bell-glass and so its life was saved for the time being. It

is, I fear (like some of Moly's *pulcherrimums* and some of Mr. H. Stansfield's *pellucidums*) a being of almost too ethereal mould for this rough world.

We have here twelve plants of the highest excellence all dissimilar and all new—a most remarkable result from a single sowing.

The parent *rarefactum* is a robust plant of perfect symmetry and with still only a single crown. In view of the results of the first sowing it is not too much to say that it is the parent of a new race of *angulares*. The off-spring will be distributed as soon as they can be propagated; but it may be, that in consequence of their extreme delicacy of constitution, they may only be seen at their best in the genial atmosphere of the south-west of England or in the still more humid climate of the Emerald Isle. In the meantime, another sowing has been made from *rarefactum*.

THE DROUGHT.

The great majority of ferns require, not only a certain amount of moisture in the soil, but also a moist atmosphere for their continued existence and health. Even though they survive for a time in a torrid atmosphere, it is fatal to their beauty and the poor shrivelled things present but a parody on their natural flourishing greenery. Although a humid atmosphere is important at all times it is doubly so when the ferns are, or should be, making their most luxuriant growth—*i.e.*, during the spring months. In this district of Reading the present spring has been one of the most trying for ferns for the past twenty years, and constant and unremitting attention has been necessary to keep them alive. March and April were cold and ungenial

and May was ushered in by a fairly heavy fall of snow. Since then (May 4th) we have had no rain worth mentioning and there has been a constant current of air passing over from the north and east, sometimes cold, sometimes hot, but *always dry*. Hoeing and scarifying the surface were effective for some time in keeping the plants alive, but by the third week in May it became evident that unless the ferns in the open air were watered they would die. A good soaking was given to the soil and the drooping tips revived, but the ferns did not grow nor have they grown since. They just live on, hoping for happier times but looking more and more miserable and jaded as days and weeks go by without the longed-for rain. It may be interesting to compare the behaviour of the different species under these extremely trying conditions. *P. angulare* varieties have suffered most, especially, of course, the more plumose and dissected forms. *P. aculeatum* does not like the weather, but stands it better than its softer congener *angulare*. The lady fern varieties have suffered less than the *Polystichums* and, when thoroughly established, look fairly well although somewhat pinched. *Lastrea montanas* also look better than might be expected, but they are all in pots in sheltered corners and the pots have stood in saucers of water all through the drought. *Lastrea filix-Mas*, most enduring of British ferns, has stood it best of all and most of the plants look fairly presentable. *Scolopendriums* (under glass) have mostly finished their fronds, but the growth is short and the fronds narrower than usual. *Polypodies*, also under glass, have mostly not started at all but have lost most of their old fronds which they usually retain until the new ones are fairly well developed. They will probably make fair growth in the late summer should any moisture arrive in the meantime. *Aspleniums*

(under glass) look unhappy and the tips of the fronds show a tendency to wither up before they have finished their growth. *Blechnums*, also under glass, have done quite well though not exactly luxuriant. Under glass with canvas shading and regular watering the forms of *P. angulare* have suffered most, especially, of course, the more complex varieties, e.g., *pulcherrimums*, *plumose divisilobes* and *pellucidums*. These started fairly vigorously in May but the growth was soon checked, and after the lower halves of the fronds were developed the upper halves remained tied up in hard knots and refused to expand further. These hard knots would have responded to genial atmospheric conditions for some time but they have now mostly dried up into dead terminal knobs and the ferns will have to make entirely new growth before they can display symmetrical fronds. They are unable to get any further until there is a change in the weather. Since the above was written a little rain has fallen (on June 19th) but the air only remained moist for one day and the ground was only moistened to a depth of an inch or so. The ordinary garden plants have all been punished. Fruit trees have dropped their crops of apples, plums, peaches, &c. Roses, pæonies and herbaceous plants generally have had to be watered to keep them alive and gooseberry bushes (unwatered) have withered and died. The only plants which have enjoyed the weather are the desert Irises and these it has suited to perfection. Probably when the fruit crops have been entirely ruined we shall have rain in abundance and to spare. This will probably not be good for the ripening corn but it will save the ferns, and we may get an autumn session of fern beauty with a fresh growth of fronds.

F.W.S.

FERN VARIATION.

Do changes in environment produce changes in structure? So far as the more elaborate varieties are concerned, it is fairly evident that the answer must be in the affirmative. We have all noticed how plants of *Polypodium v. Cornubiense*, when negligently grown, will gradually become coarser and coarser until they are absolutely normal *P. vulgare*. Now certain conditions predispose the plants to this degenerating process, whilst other conditions will retard it and tend towards rejuvenation and possibly towards eventual redemption.

A. f.f. Kalothrix, if much punished and grown in the open air, will cease to produce true *Kalothrix* fronds and will become a sort of bastard *sub-plumosum*, from which condition it appears to be impossible to extricate it.

The finest types of *A. f.f. unco-glomeratum* are more or less apt to fall from grace, and to develop into ordinary *acrocladon*, especially if grown under hard or unkind conditions.

This gradual deterioration in character always corresponds to deteriorated conditions. The plants feel they are being sweated or unfairly treated, and respond by restricting the output as regards character.

No two districts are exactly alike as regards the conditions of growth. These varying shades of difference may be and are inappreciable to human beings, but make all the difference in the world to such ultra sensitive organisms as ferns.

Any type of fern grown for a long time under a certain set of fairly constant conditions, will insensibly differ in course of time from the same fern grown under quite different, although not necessarily uncongenial, conditions. It is pretty generally admitted that the progeny will

differ—in fact, they are almost bound to do so, but that the plants themselves will alter is a matter which has been for some time open to question.

The writer received a filmy fern from Costa Rica. The fronds were pinnate, and resembled *T. auriculatum*, although the habit was different. After growing the plant for many years it was noticed that there was a tendency towards bipinnation, which tendency became accentuated and accelerated after a few more years' growth. Eventually the plant turned out to be *T. radicans*, from which it is now undistinguishable. The very dwarf *T. Colensoi* and *T. pyxidiferum* grew to five times their original size, when grown here under intensive culture, and are now apparently identical, although differing widely when first acquired.

After growing most of the broad and narrow forms of *Scolopendrium crispum* under the same uniform conditions for thirty years, the writer has come to the conclusion that there is no permanent difference between many of the forms. The broad forms became narrower and the narrow ones broader, the result being a sort of compromise. Certain localities tend to produce the narrow and certain others the broad types. These types will persist for quite a number of years even if the plants or localities are transposed, thus keeping alive the fiction as to the immutability of these sub-varieties.

Much evidence may be adduced as to the mutability of varieties in general. Some have proved themselves :—

“Constant as the Northern star

Of whose true, fixed, and resting quality

There is no fellow in the firmament.”

The behaviour of such ferns as *L. p.m. ramulosissima* (which, after many years of virtuous striving and conduct

the most exemplary and blameless, forsook the strict path of varietal rectitude) bears out the words of the poet :—

“Thy honorable metal may be wrought
From that it is disposed, therefore 'tis meet
That noble minds keep ever with their likes,
For who so firm that cannot be seduced.”

It is unnecessary to labor the point in order to prove the sportive character of the varieties, which is obviously due to the cumulative effects of environment. The Azorean type of *Lastrea dilatata* differs from the British, both in appearance and in hardiness. This is due to its long residence in a very mild and humid climate. The difference between *Lomaria Chilienses* and *L. Magellanica* is due solely to climate, the latter (coming from a higher latitude where the mean temperature is much lower) has more substantial and leathery foliage than its Chilian relative. This difference disappears after twenty-five years' culture under glass in England.

There is a type of *Polystichum* brought from Norway by the Hon. F. G. Wynn which seems like a blend of *P. lonchitis* with *P. Acrostichoides*. It has the outline of *lonchitis*, with the coriaceous foliage of *Acrostichoides*.

“The voice is Jacob's voice, but the hands are the hands of Esau.” This is not an impossible combination, the writer having seen many very successful crosses between *P. angulare* and *P. Acrostichoides*.

Our British *Polystichums* are all relatives, and not improbably simple varieties of one original stock. *P. lonchitis* appears to be as easily killed by heat as is *Asp. marinum* by frost. *P. aculeatum* is not unlike *P. lonchitis* in certain stages of its development, and there are intermediate types which would be difficult to classify. There are also intermediate types between *P. aculeatum* and *P. angulare*.

In certain localities *aculeatum* is the prevailing type and in others *angulare*. Spores sown from either *angulare* or *aculeatum* in an *angulare* district would produce a preponderance of *angulare* and in an *aculeatum* district *vice versa*. Plants of *aculeatum* which have been under careful observation here for several decades, appear now to be more *angulare* than *aculeatum*, this being an *angulare* district.

If we had a Methuselah who might have had individual plants under close observation for centuries, he would be a decided acquisition to the fern cult. The variation in extreme types being necessarily much slower than in closely allied varieties, it will require a long series of careful observations before we are able to dogmatise.

Eventually what now appear "trifles light as air," may in the light of further knowledge become "confirmation strong as holy writ."

H. STANSFIELD.

[The question raised by our correspondent as to changes produced by environment, and answered by him in the affirmative, is one of the highest scientific importance, and has long been the battle ground between opposing schools of biologists, although it is the *inheritance* of acquired characters, rather than their actual occurrence, which has been debated. That changes can be brought about by environment, both in plants and animals, is undoubted, but the question is whether these changes are (i) temporary or permanent, and (ii) inherited or otherwise. The examples adduced by our correspondent are not all quite convincing, e.g., *Polypodium v. Cornubiense* is a plant of notoriously unstable character; that is to say, it will vary, not only when the conditions are changed, but *without* any perceptible change of environment. The same is true, to a less extent, of *A. f.f. Kalothrix* and

A.f.f. unco-glomeratum. In 1917 a plant of *Polypod. v. Hutchisonii* (the Welsh find of Cornubiense) of medium type grown from a single rhizome became finer on one side and coarser on the other, and was in 1918 divided into two plants of quite distinct appearance, although still growing side by side. A portion of a clump of hybrid yellow *Iris* has changed to purple, although still continuous with the yellow portion, and *vice versa*. These are both sports due to the unstable character of the protoplasm of the plants in question. On the other hand in Mr. Henwood's collection of *Scolopendrium crispums* the sub-varieties maintain generally their individualities. It is true there are temporary departures from character in individuals but these generally come back to their true character sooner or later. At the present time *crispum grande* Wills is as broad as ever and *crispum*, Bowden as narrow as ever. The Roundstone *crispum* has been out of form for a year but has now returned to its flat, pleated, and pointed character. The late Mr. E. J. Lowe stated that a large collection of varieties of *Scolopendrium* had become normal while growing under unfavourable conditions in his garden, but had regained their varietal characters when more kindly treated. Mr. Stansfield's experience with *Trichomanes Colensoi* and *T. pyxidiferum* would seem to suggest that these two names cover only one species which puts on different characters when grown under different conditions. Botany has been, in the past, studied much too exclusively from dried specimens. The study of *living plants* under cultivation, and under varying conditions, might throw quite a new light on many cases of supposed specific difference.—Ed.]

A COLUMN FOR BEGINNERS.

This column has been asked for and the Editor will be glad to answer (or get others to do so) any specific question which may be sent by beginners or those comparatively inexperienced in fern culture. In the meantime a few general hints are appended which may be of use to the raw hand. In the first place, ferns are made of the same stuff as other plants, and, with a very few modifications, the same principles apply to their culture as are observed in the cultivation of, *e.g.*, flowers and vegetables. That is to say, they must have sufficient room, air and light; they must have food and water of suitable kind and quantity, and they must be protected from animal vermin and from weed competitors. In the matter of space they should be sufficiently separated to be able to make their season's growth without touching or overhanging each other, and so that the soil between them can be got at to be cleaned, dressed, and aerated. With regard to soil, provided that other conditions are favourable, it is surprising what a large number can be grown in any good garden soil in the open air. The Lady Fern, the Male Fern in its three subspecies, *Polystichum angulare* and *aculeatum* and *Scolopendrium vulgare*, and most of their very numerous varieties come under this head—quite enough to stock a very considerable garden to begin with, and comprising the great majority of ferns found in most collections. Of specialists in soil among ferns we have chiefly the lime lovers and the lime haters. The former are, however, less violent in their love than are the latter in their hate. That is to say, the lime lovers will often live and thrive fairly well for a considerable time in soil which contains a very small proportion of their special element; while the lime haters will speedily dwindle and eventually die in soil which contains

any appreciable proportion of lime. The lime lovers are *Scolopendrium vulgare*, *Polypodium vulgare* (not so particular), *P. Robertianum* (*calcareum*), *Cystopteris fragilis*, *Asplenium trichomanes*, *A. viride*, and *A. Adiantum-nigrum*, while the lime haters are *Lastrea montana*, *L. dilatata*, *L. spinulosa*, *cristata*, and *uliginosa*, *Blechnum spicant*, *Polypodium dryopteris*, *P. phlegopteris*, *Allosorus crispus* and *Osmunda regalis*. The lime haters are mostly peat lovers, the exception being *Lastrea montana* which loves a yellow loam and is rarely found wild except in a soil of this nature. We have, however, seen this species doing well in peat, and quite recently it was seen thriving in a soil consisting almost entirely of decomposed cocoanut refuse. *L. dilatata* will grow in any soil which is free, or almost free, from lime but prefers a mixture of loam and peat or loam and leaf-mould. The semi-bog ferns *L. cristata*, *uliginosa* and *spinulosa* prefer a soil of a peaty nature and require plenty of water. The same is true of *L. thelypteris* and *Osmunda regalis*, which are bog ferns pure and simple. All the foregoing remarks apply to ferns which are planted out either in the open air or under glass. When they come to be grown in pots the case is entirely altered and much greater care must be taken as to the quality and texture of the soil. Instead of garden soil, fibrous loam forms the basis of most fern composts, an admixture of leaf mould being also generally beneficial. A little sand is sometimes useful when the soil is heavy and close but is not necessary when the other ingredients are of good quality. A good fern compost for potting should be fibrous and elastic having something of the feel and texture of good strong tobacco. An excellent lightening medium, when it can be obtained, is cocoanut refuse, especially that containing plenty of hard fibre, as this decays slowly and keeps the soil porous

and springy for a long time. A very important point in the culture of ferns in pots is the *exclusion* of earth-worms. Although these creatures are harmless or even beneficial in the open ground, yet in the restricted space of a pot a single worm will quickly destroy the texture of the soil, converting it into mud or the semblance of mortar and very soon blocking up the drainage. On the other hand, worms have been known to cause the death of a fern by making channels in the soil through which the water ran away leaving the ball of soil practically dry. An easy method of getting rid of worms in pots, in all cases except the lime-haters, is the saturation of the soil with clear lime water. The worms greatly dislike this and quickly come to the surface when they can be picked off and got rid of. The lime water must not of course be applied to the fronds. The matter of shading is often overdone by beginners, especially when the ferns are grown in glass structures. The object of shading should be merely the exclusion of direct sunshine from the ferns, especially during the heat of the day. Provided this be accomplished the more light the ferns have and the better in the great majority of cases. Even a little sunshine towards evening is often not harmful in the presence of sufficient moisture and reasonable ventilation. In small structures, therefore, moveable blinds are preferable to anything of the nature of whitewash on the glass which may render the house too dark in dull weather and is, moreover, in itself somewhat unsightly. In the case of pot ferns success may depend, to a very large extent, upon regular and judicious watering. A fern growing in rockwork or in the open ground is able to live during a season of drought by sending roots in search of moisture into a deeper stratum, but when the roots are confined to a pot this is impossible, and dryness means sudden death. It is in dull and wet

weather that ferns in pots under glass are, perhaps, most liable to be neglected. Everything out of doors being saturated, it is not realised that the ferns under glass require water, and consequently they may be left unwatered until the drooping fronds indicate distress, and it is then found that the soil, although apparently moist upon the surface, is dust dry beneath it. A thorough soaking in a bucket of water may moisten the soil and revive the drooping fronds, but it is not to be supposed, even in that case, that no harm has been done. The system has received a shock from which it may take years of careful living to recover thoroughly. Ferns in pots must *never be dry*, nor, on the other hand, must they be always wet or the soil will become sodden and sour. There must be intervals when it can become sufficiently dry for air to penetrate into its interstices, but this must be *moist air*. No fern can thrive in soil of a putty-like consistence.

AN EXCHANGE COLUMN FOR MEMBERS.

The following member would like to correspond with others having plants for exchange :—

The REV. H. A. SOAMES,
 "Hazelcroft,"
 Mason's Hill,
 Bromley,
 Kent.

BRITISH PTERIDOLOGICAL SOCIETY.

Dr.

BALANCE SHEET, 1919.

Cr.

1918.

	£	s.	d.
To Balance at Bank	12	6	3
" Cash in Secretary's hands	1	13	2½
" 54 Subscriptions at 5/-	13	10	0
" 6 do. in arrear, at 5/-	1	10	0
" 7 do. in advance, at 5/-	1	15	0
" 3 Volumes and Postages at 3/9 each	11	3	
" 3 do. do. at 4/0 "	12	0	
" 2 do. (one with Reports) and Postage	9	0	
" Back Numbers of Gazette and Postages	11	9	
" Interest at Bank		s.	d.
Less Commission		7	1
do. Cheque Stamps		10d.	
		2d.	
		1	0
	6		1

£33 4 6½

1918.

Dec. 12th By Cheque: Metcalfe & Cooper, Ltd.— Printing of Resolutions, and Envelopes	3	0	6
1919.			
May 9th " Cheque: Metcalfe & Cooper, Ltd.— March Gazette	9	8	0
" Postages for the Year	2	8	5½
" Stationery	4	6	
" Balance at Bank	16	9	8
" Cash in Hand	1	13	5

£33 4 6½

The number of Subscribers is 141 including 10 New Members who have joined in the passed year. The Society has lost four Members by death, (including Mr. A. A. Odd, who lost his life while serving his Country in the North Sea, in January, 1918), and one has resigned. There are, in addition, Three Honorary Members.

Audited and found correct,
(Signed) J. J. SMITHIES.

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No. 3.

... The ...

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PUBLISHED QUARTERLY.

September, 1919.



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F. W. STANSFIELD, M.D.

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Middlesex).

KENDAL, WESTMORLAND.

THE BRITISH FERN GAZETTE.

NEW SERIES.

VOL. 4.

SEPTEMBER, 1919.

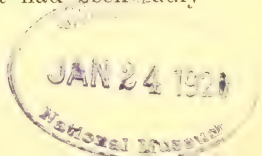
No. 3.

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EDITORIAL NOTES.

It was a matter of deep regret to the Editor, in common with the other officers of the Society, that the Annual Meeting and Excursion had to be abandoned, as he had expected to have the opportunity of again meeting old friends, and making new ones among the members. It is hoped that this pleasure may not be postponed more than another year, and that a record meeting in August next may make up for the delay and solve some of the difficulties of the Society. In spite of all obstacles, the Editor and Hon. Secretary decided to sample Wales as a fern-hunting field. Accommodation for two was obtained with some difficulty in a remote part of Merionethshire (Dinas Mawddwy), and a happy, though somewhat strenuous, period of ten days during August was spent in assiduous hunting. The district is naturally a beautiful one, but had been sadly



marred, from the picturesque point of view, through the almost entire denudation of the hills and valleys by the cutting of the timber. Notwithstanding this skinning process the district abounded in ferns, but did not come up to our expectations in the matter of varieties. The geological formation was entirely slate and the number of species found was greatly limited by this monotony. The prevailing species in the lanes were the lady fern and the male fern, with a small proportion of *L. dilatata* and *L. montana*, and a very sparse sprinkling of *Blechnum spicant*. The hills were hummocks of slate with smooth and steep sides, and were often unclimbable except by the gullies down which water had rushed at some time or other. Most of these gullies were now dry or contained only a trickle of water. The steep sides of the hills were clothed by bracken interspersed with *L. montana*, the latter species sometimes covering large tracts of ground. Great numbers of these plants were examined, with some difficulty, and not without danger to life and limb in places, but few variations of importance were discovered. Probably the best thing found was a neat *congesta* form of *L. montana* by Mr. Cranfield. Other forms of this species were a *subplumosa*, a *foliosa*, a narrow form resembling *pseudo-mas Pinderii*, and a *variegata*, the last, however, being not thorough. Two or three fronds were beautifully marbled, the rest being green. It is hoped that something may be got from it, by spores or otherwise. High up in the gullies the Parsley and Beech Ferns were found sparingly, and of the latter the curious laciniate and tripinnatifid form figured by Lowe and Drucy under the inappropriate name of *multifidum*. Although some of the fronds are very beautiful and distinct (much better than the figure above

mentioned), as in previous finds of this singular form, there was always a proportion of normal ones, and so the variation could not be regarded as constant. Congested and foliose forms of *L. filix-mas* and *Athyrium f.-fœmina* were noted, and of the latter species was seen a form with very stiff and rigid footstalks and perfectly upright habit. This latter was left behind, rather to our subsequent regret, as we thought it might have been useful for crossing with some of the more pendulous plumose varieties in order to correct a weak habit. Of *Polystichums* we saw none, and *Aspleniums* (*trichomanes*, *ad-nigrum*, *ruta-muraria* and *Ceterach*) were found only sparingly in the mortared walls of the villages. *Scolopendrium vulgare* was scarcer still, only very tiny scraps being seen in the walls.

We learnt afterwards that our friend, Mr. G. C. Druce (a hunter, however, of species rather than of varieties) had found in the Cader Idris district *Asplenium germanicum* and *A. septentrionale* and *Woodsia ilvensis*. That rich botanical region, although not many miles away, was practically inaccessible to us as the only motor car in the neighbourhood was away undergoing repairs and we were restricted in our wanderings to the use of "Shanks's pony."

We enjoyed a pleasant and health-giving holiday, but we cannot recommend the district as a rich one for the purposes of our Society.

The Editor will be obliged to any member or reader who can supply him with *Asplenium Adiantum-nigrum microdon* or *A. lanceolatum microdon*, either for cash or exchange. The plants are required for a scientific purpose, viz., experiments in raising them from spores in order to determine, if possible, the parentage of these varieties or hybrids.

Members who have not paid their subscriptions are requested kindly to forward same to the Hon. Secretary, Mr. W. B. Cranfield, East Lodge, Enfield Chase, Middlesex, without further delay.

NEW FERN.

SCOLOPENDRIUM V. ACROCLADON. BUCHAN-HEPBURN.

We have received, through our President, Mr. Alex Cowan, a frond of a fine *ramosissimum* form of *Scolopendrium vulgare*, found some years ago by our member, Sir Archibald Buchan-Hepburn, at Logan, Wigtonshire. It branches and re-branches in rachis and lamina, thus forming a fan-shaped frond which terminates in hundreds of sharp, projecting points. Although forms resembling this have doubtless been raised from spores, we are not aware that anything quite like it has been previously recorded as a wild find. It corresponds fairly well to the variety *acrocladon* in *Athyrium filix-fœmina* and *P. angulare*, and may quite well bear the name at the head of this paragraph.

FERNS AND SHOWS.

Ferns and Shows! "What have they in common?" is perhaps the first thought of the collector. This delightful hobby of ours, which leads us far afield, into deep lanes and mossy woods, and where cool streams refresh the mountain side, why should we think of it in connection with the glare and heat of the exhibition tent—why should we coax our favourites from their quiet nooks and constrain them to stand on show? Half our joy comes from the seclusion of

our treasures, shall we not rob them of their charm by courting the public eye ?

There is undoubtedly much truth in all this ; still, one of the truest instincts of the collector is the wish to share his pleasures. Who ever rode a hobby untouched by the desire to demonstrate the beauty of its paces ? Fern lovers who believe in their cult will not shrink from the dissemination of their secrets even if they have to face a Show.

Where native ferns are concerned there is at hand a considerable bastion of prejudice. It is composed of various elements ; but the chief is sheer stark ignorance, and our problem is :—How can it best be stormed ? There would be good hope could we bring it within reach of the beauty of our fern paradises ; but this being out of the question, bastions are bastions, the most hopeful method seems to be the marshalling of our ranks of loveliness, and leading them bravely to the assault, until ignorance melts into appreciation.

And native ferns can make conquests at shows. Readers of the *GAZETTE* will remember a plate (Vol. 3, p. 63) portraying a set of six which won at the Royal Horticultural Society's Show in Dublin. In the ferns themselves there was nothing exceptional ; doubtless many of our members said, as they looked at this picture, " Mine would beat those " ; nevertheless, the Horticultural Society appreciated them so thoroughly that it selected the exhibit for illustration, and the plate which appeared in the *GAZETTE* had been engraved for the Society's *Journal*. The truth is that there are few shows where good varieties are not a revelation. " Why," you may hear the visitors exclaim, " they are equal to any in our greenhouses," and there are many who readily rank them with the best exhibits that the show contains.

This being so, it becomes a duty to introduce our treasures to the wider circle whose admiration awaits them, and it is worth while to consider the circumstances which govern success in preparing for shows. Everything may be said to hinge upon "condition." Judges who credit what they see are blind to what was seen the week before, and to what may be seen the week after. Even when the judges thoroughly understand their subject—and this is not often the case with judges of native ferns—no matter how fine the specimens, or how rare the varieties, they will have to yield to others whose intrinsic merit is inferior, if they either have not reached, or have outpassed their best on the day of the show. Form and colour seem the most important points. To secure first honours the specimens must bear a sufficient number of fully expanded fronds to exhibit all the typical characteristics of the variety, and the colour must be such as would be seen in Nature's favourite haunts, a green whose fresh, rich beauty is unmarred either by sun or time.

To ensure these conditions at a given date some care and forethought are necessary. Many plants from which to choose and a variety of places for their growth are the keys to success. It is well to make a rough selection months before the show : do it in winter before the fronds begin to move. If you are required to set up six aim at having as many as eighteen from which to choose. Ferns are less likely to disappoint than the majority of exhibition plants, but it would be rash in the extreme to select only the required number and expect them all to develop to perfection. When the selection is made, the positions chosen for growth will vary according as the show is early or late. Adequate protection from frost must be at hand

for all; but, in addition, the houses chosen, and the positions in the house, will vary as to aspect and heat according as the grower desires to hasten or retard; and the same, though in a more limited degree, applies with reference to ferneries in the open air. Particularly valuable is a deeply sunk frame or pit, out of reach of sun or wind, whose "lights" can be easily removed or replaced as weather may require.

Should it be thought desirable, I shall be happy to devote a future paper to an examination of the varieties which prove most attractive at shows. I fancy, however, that this is unnecessary in a journal devoted to experts, and I shall content myself with saying that all is likely to go well if your collection is sufficiently large, and you can command a variety of sites for growing.

The time when the ferns should be placed in their exhibition pots will be governed by the rules of the show. Where the size of the pots is not specified, plants may be lifted from an out-of-doors fernery the day before they are wanted. In my last winning stand of six, two came from the open, and went back to it, little, if at all, the worse, the day after the show. More difficulty is experienced when pots of a limited size, eight, or even seven inches at the rim, are expected. In such pots, remarkably fine specimens can be grown, but the potting ought to be done in the winter, and great care as to drainage and watering is essential.

In staging my ferns, when at last they reach the show, what I aim at is symmetry and similarity of colour. Attention is given to these points throughout, but it is sometimes astonishing how different plants look in the comforts of their home from the appearance they present when mar-

shalled in the artificial atmosphere of the tent or public hall. Some, whose colour you thought quite satisfactory, refuse to look well in the new light, others seem unwilling to accommodate their shapes to their new surroundings. An exhibitor who desires to appear at full strength will guard against such disappointments by taking with him a reserve supply of specimens. Only thus can due precaution be taken against the difficulties of novel light and unexpected situations.

H. KINGSMILL MOORE.

Our contributor does well to point to the importance of "condition" (*i.e.*, healthy colour and symmetry of growth) as governing success on the exhibition table. We have often noticed that a well-grown and well-coloured specimen of a quite ordinary variety will elicit far more admiration from the unlearned visiting friend than an inferiorly developed plant of the rarest and most advanced variety of the same, or another, species. This preference is both natural and right, and ferns, like other plants, must be judged by their immediate effect. The expert, of course, looks beyond this, and sees in a fern, not only what it is *now*, but also what it ought to be under proper conditions. We must not, however, expect this prophetic eye to be used at a show, since the display is to appeal to all observers.—EDITOR.

BIOLOGICAL QUESTIONS.

To the Editor of THE BRITISH FERN GAZETTE.

DEAR SIR,—Last Spring I gave an address on "British Fern Varieties" to the members of the Toynbee Natural History Society, exhibiting a number of fronds, both fresh

and pressed, to illustrate the subject, in default of lantern slides. This has been followed by a request from the South London Natural History Society that I would fill a gap in their lecture list by giving the same paper. I agreed, and the address was given to them on the 12th inst.

It has occurred to me that the main lines of the paper, with the questions and criticism evoked, might be of interest, so I give a brief account.

As Natural History was the main concern of the two societies, I endeavoured, as far as possible, to deal with the purely scientific aspects of British Ferns and their culture, and did not unduly emphasise the horticultural value of the plants. Thus, I gave a short account of apospory and apogamy, and pointed out how directly their discovery and investigation had depended upon fern cultivation. In connection with this, various other methods of propagation were mentioned (as additional to the normal propagation by spores), such as offsets and bulbils, and especially the many examples of induced bulbils on frond bases, etc.

Particular stress was laid on the great number of wild finds, and this led to mention of the many beautiful strains directly originating from these wild variations.

The raising of undoubted hybrids was mentioned, and a frond of *Polypodium vulg. multifido-elegantissimum* formed a very apt illustration of this. The raising of *P. Schneiderianum* formed a fitting conclusion to this branch of the subject.

Then a description of the various types, such as crested, plumose, congestas, etc., was given, and it was noted that barren plumose forms gave a clue to an explanation as being due to diverted spore-energy.

I cannot at all complain of lack of interest on the part of

the audiences. On both occasions many questions were asked at the conclusion of the addresses. At Toynbee there seemed to be great surprise at the wonderful preservation of some of the evergreen fronds, such as *P. v. Cambricum* and *pulcherrimum*, and especially of *Polystichum ang. div. stipulatum* (Carbonell) after such hard winter weather, the fronds in question being from outdoor plants. The botanical section brought up the usual remarks, very delicately, it is true, as to "mere monstrosities," but generally I found the extent of variation and the attempts to explain it were giving the botanical minds "furiously to think."

At South London three main lines of questions were raised :—(1) Whether the fact that spore-formation diverted was the origin of much variation did not reduce the importance of the instances, as they would be unable to propagate in nature? This I countered by alluding to the multitude of fertile varietal forms, especially in *cristatas*. (2) Why varieties tend to "go under" in a wild state. This I explained as well as I could, and stated the ease of raising numbers of true instances under glass, as proving the arguments. (3) A number of requests as to any economic value in ferns, which the back numbers of the GAZETTE enabled me to answer.

The main drawback to my effort was the lack of fronds in my possession, of undoubted wild finds. In anticipation of any possible future "Fern Talks," it would be of great assistance if any member of our Society cared to send me a frond or two of such forms, for pressing, or, if preferred, small offsets for growing in garden. The way in which botanists in the past tended to rank the varieties as "species" naturally gave great prominence to this matter of wild origin. To guard against sending forms I already

possess, I should prefer correspondence, or mention in GAZETTE if possible, as a preliminary, thus saving wasted effort.

FRANCIS W. THORRINGTON.

“ Ferncote,” Emerson Park,
Hornchurch, Essex.

We are glad that our correspondent is interesting natural history societies in the biological problems, of which there are many, presented by our British ferns and their varieties. Some of these have been discussed by the late Mr. Druery and others in previous numbers of the GAZETTE. The theory of diverted spore energy, as accounting for luxuriant leafy development, for instance, is attractive, and seems to apply in many cases, such as the barren plumose forms of *Polypodium vulgare*, *Scol. vulgare*, *Asplenium trichomanes*, *Lastrea montana*, etc., but there are some perplexing facts which do not quite “ fit in.” Many of the best plumose varieties of *Athurium f.f.* for instance, are abundantly fertile, e.g., all Mr. Druery’s “ superbum ” series, the Horsfall variety, and *Kalothrix*. In *P. angulare* again, Wollaston’s *plumosum* is a free spore bearer, and almost all the plumose forms will bear spores occasionally, even the most highly developed of the plumose-divisilobe strain ; in fact, we are only aware of two plumose angulares which have proved, so far, invariably barren. These are the old *plumosum* of Elworthy and Moly’s *plumosum grande*. Again, the occasionally fertile plumosums are not less luxuriant in development when fertile than when they are sterile. Among *Polypodiums* also, the variety *pulcherrimum* and the Oxford *omnilacerum*, both abundant spore-bearers, are as foliose as any of the *Cambricum* section. We have sent Mr. Thorington a frond each of two exceedingly massive and

leafy *Polystichums*, viz., Mr. Cranfield's *aculeatum densum*, and a giant foliose *angulare rotundatum*, found by the Editor, both of which produce spores in such abundance as to actually weigh down the fronds when the spores are fully developed. Although diverted spore energy is probably a factor in the production of excessive leafiness, it is obvious that there are other factors to be considered.—EDITOR.

GOING BLIND.

This mysterious malady, as affecting ferns, is sometimes extremely perplexing to the cultivator. It occurs generally when the plant is in a depressed state of health, as after an injudicious removal, or a dry time, or an attack of insect pests. The fern suddenly ceases to produce fronds, the crown becomes hard, and there are "no eggs in the nest." Growth comes to a complete standstill, even though both roots and fronds may be apparently healthy. The roots, however, generally die before long and the fronds gradually begin to look sickly. Sometimes the condition comes on not as the result of any discernible check, but may occur immediately after a period of exuberant growth, apparently as a kind of vital or systemic exhaustion. The ferns most liable to it are the *Polystichums*, especially the more highly developed varieties of *P. angulare*, e.g., the forms of *brachiato-cristatum* and *pulcherrimum*. It occurs also among *Scolopendriums*, and has been seen in *Lastrea montana*, but is very rare in *Athyrium*, *Lastrea filix-mas* and *L. dilatata*. The only normal species in which we remember to have seen it was *Lastrea rigida*, and this was a plant which had been much neglected. If, in this blind condition, the plant be

simply left to its own devices, it will probably die, but, as a rule, its life can be saved by careful treatment and sometimes, indeed, the trouble may become a blessing in disguise by causing the crown to break up into a multitude of buds and thus making stock of a rare variety. The treatment consists in carefully conserving what life is left in the plant, and waiting for Nature to make a fresh start. Should the roots be dead or in unsuitable soil, it may be wise to shake out the old soil and re-pot or re-plant in the best stuff available. Should the roots appear healthy they may be left alone, but the plant must not be overwatered, nor must it be allowed to become dry. The most important thing, however is *to preserve the existing fronds*, as they may have to serve the plant for two or three years. By means of a bell glass or similar protection they can generally be kept green for at least two seasons. No frond, however shabby, should be removed until absolutely dead. Eventually a fresh start is made either by a bud appearing in the centre of the blind crown, or by a number of little crowns forming around the base of the old one, or the whole blind crown may develop into a cauliflower-like mass and thus give rise to a large number of fresh growing points. The plant must be carefully nursed until these are large enough to be separated, and then the whole mass may be split up into its constituent parts, and these, in turn, must be carefully tended until they become established as independent individuals. The tiniest scraps, even if quite devoid of roots, will generally grow if placed round the edge of a small pot and covered by a bell glass. We believe that most of the existing plants of *P. aculeatum pulcherrimum plumosum*, Green have arisen from a single bulbil on Mr. Green's original plant, which, in Mr. Druery's

hands, developed into a "cauliflower." Again, a bulbil of *P. angulare* d. p. *Baldwinii*, given to the writer by Mr. Henwood, went blind after a severe winter, and remained apparently dead until the following autumn (1917) when a very small green bud appeared in its centre. Next year it became a bunch which was split up into thirteen fragments, all of which grew into healthy plants, the largest having now fronds ten inches long. Thus, as the result of this apparent catastrophe, quite a number of friends have obtained plants of a choice variety for which they might otherwise have had to wait for many years.

F. W. S.

A GLOSSARY.

NAMES OF VARIETIES OF BRITISH FERNS.

The inception of this column is due to a suggestion from the Rev. Canon Kingsmill Moore, who is collaborating with the Editor in its compilation. The varieties will be taken in approximately alphabetical order under their respective species, also in alphabetical order. It is not proposed to translate names which are closely allied to English words, and the meaning of which is therefore self-evident, such as *acutum*, *obtusum*, *densum*, *laxum*, etc. Members are invited to ask for further elucidation of any explanations which they may find unsatisfying or obscure.

(An instalment of the glossary will be published in our next issue.)

THE DISADVANTAGES OF FERN HUNTING.

To the Editor of THE BRITISH FERN GAZETTE.

SIR,—We have been told, from time to time, a great deal about the delights and advantages of fern hunting. I should

like, with your permission, to say a little on the other side. The enthusiastic hunter goes out full of hope and looking in every corner to find a great prize. Generally speaking, *he does not find it*, but he finds many small departures from the normal. At first he leaves these as not worth troubling about, but at last, tired or ashamed of an empty bag, he begins to pick up the inferior things and takes them home in the hope that they may improve or that "something may be raised from them." *They do not improve*, but he has not the courage to throw them away, and so his garden gradually becomes choked with poor things of his own finding. He has little or no room for the many beautiful things found (at rare times) or raised by others, and so his garden is found a disappointment by his non-hunting visitor, who picks up good things from every available source and prides himself upon growing only the best. The visitor goes away saying under his breath, "What a pity he does not clear out that rubbish and make room for something worth growing!" Another evil is that the hunter has little or no time to make his garden beautiful, since he is away hunting for the elusive phantom prize when he might be cultivating his garden, and so doing justice to the many beautiful ferns to be had for little or nothing. While pursuing a shadow he is losing the substance. Of course, it is every man to his taste, but give me the pleasures of a garden full of the best ferns, of which there are enough for me already.—I am, Sir,

Yours contentedly,

"STAY-AT-HOME."

We have charitably allowed our correspondent to hide his identity under a pseudonym. He takes an extreme view, but there is a method in his madness, and we may

learn something from his eccentricity. He, however, admits that good things have been found at rare times "by others." If by others why not by himself? Most hunters will probably plead guilty to having, at times, taken home third-rate things as finds, saying, or rather feeling, with Touchstone, "an ill-favoured thing, sir, but mine own." If a man chooses even to fill his garden with personal finds to the exclusion of possibly better things it is his own affair. It is, however, a good thing sometimes to take stock of our finds and to discard those which are manifestly inferior to others of similar character *i.e.*, as our correspondent crudely puts it, "to clear out the rubbish." —EDITOR.

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KENDAL, WESTMORLAND.



THE
BRITISH FERN GAZETTE.
NEW SERIES.

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DECEMBER, 1919.

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EDITORIAL NOTES.

The Editor regrets that the GAZETTE has fallen behind its proper date of appearance. This lack of punctuality is due to a combination of causes of which the most important was the holding up of the June number by the difficulty and delay in the arrangements for the Annual Meeting. We hope to return by degrees to the normal date of issue.

We have received from Mr. B. Wall, of 393, Heneage Road, Grimsby, a letter and sketch describing a miniature fern case, 3 feet by 2 feet, which he has arranged upon a table outside a window in his backyard, and in which he succeeds in growing quite a number of ferns, including *Blechnums*, *Scolopendriums*, *Cystopteris*, *Aspleniums*, &c. Mr. Wall manages to grow *A. Ruta-muraria* by picking holes in a piece of tufa. The *Aspleniums* are planted in the holes and the tufa is suspended by wire from a rod near

the roof of the case. This is an ingenious plan which may be tried by others who have more space at their disposal than has our correspondent. Many people find difficulty in keeping *Ruta-muraria* and *Ceterach* for any length of time. Mr. Wall finds spent hops from a brewery to answer instead of leaf-mould. We presume he keeps the hops until well decayed before using them; otherwise moulds and other fungi would probably be found troublesome.

Members who have not paid their subscriptions will oblige by sending a remittance at once to the Hon. Secretary, Mr. W. B. Cranfield, East Lodge, Enfield Chase, Middlesex. Literary contributions to the GAZETTE should be sent to Dr. Stansfield, 120, Oxford Road, Reading.

NEW FERN.

POLYSTICHUM ANGULARE DIVISILOBUM PERCRISTATUM.

We have received from Rev. E. H. Hawkins, of Stroud, a plant of an interesting cross-bred *Polystichum angulare*, in which are combined the characters of a *divisilobum* and a *percristatum*. Mr. Hawkins received it, as a small plant, from Mr. H. Stansfield, by whom it was raised. From its appearance we imagine it to be a cross between *divisilobum proliferum*, Bagg (otherwise *Henleyæ*), and *percristatum*, Moly. The presumed parents are among the best forms of the sections to which they belong, and the offspring is likely to be more stable in character than, for instance, numerous crosses between the polydaetylous and divisilobe sections. We have named the seedling, provisionally, *P. a. divisilobum percristatum*, Stansfield. It promises to be a neat thing.

FERN CHAT.

Perhaps the most constant variety of all our British ferns, that is, the one repeating itself with the greatest fidelity from spores, is *Osmunda regalis cristata*. One may examine tens of thousands of these without encountering the slightest improvement upon or retrogression from the parent plant. Another very fixed and constant fern is *L. p. m. crispa cristata*. With the exception of Sang's *angustate* seedling, which is remarkably good, no other break has yet been observed. Individual plants of Sang's variety vary much more among themselves than do *L. p. m. crispa cristata*, and it is through the *angustate* types that we must look for improvements in this section in the future. *L. p. m. crispa gracilis* has for a long time sustained its reputation as a constant and immutable variety, although recent sowings show a distinct attempt at furcation or subcristation of the tips of the fronds which was absent in the seedlings of 50 years ago, and which is likely to become accentuated in seedlings in the future.

It is a singular thing that it appears to be a difficult matter for some ferns (*Scolopendriums* more particularly) possessing two combined characters, of which cristation is one, to transmit both characters unimpaired to posterity. The cristate character is likely to improve, but the advance in cristation is usually at the expense of the associated character, which is often more or less obliterated. It will be noticed that the undulation in *S. v. crispum fimbriatum grandiceps* has given place to heavier cresting and a more branching habit, and the fern is now scarcely recognisable as a form of *crispum*. *Scol. v. spirale* was originally a plant whose fronds were entire. In course of time a slightly multifid type was evolved, sowings from which in three or four generations resulted in a race in which not only the

undulations but the whole body of the frond actually disappeared, nothing remaining but a dense mass of cristation, the plants on the whole becoming slightly dwarfed in the transformation. The now well known *S. v. condensatum* is the plant in question.

Why should one sowing of *S. v. c. fimbriatum* produce a full crop of true seedlings and another sowing from the same plant produce only a small proportion of true forms, and the remainder almost normal *S. vulgare*? It has often occurred to the writer that the earliest conditions of growth from sowing until fronding may have some influence in determining the future characters of some of the more unstable varieties of hardy ferns. If the spores are of high germinating power, and sown as soon as ripe, there will be a greater proportion of true seedlings than would have been the case had the conditions been less congenial. If the seedlings come away quickly, and the period of commencing growth happens to synchronise with good atmospheric conditions (warm, moist and not too sunny weather) then the highest type of character may be expected. Sowings of *S. v. sagittato-projectum* not unfrequently result in nothing but normal *vulgare* when the weather conditions are not good (say in June), whereas another sowing which matures in early autumn may contain a reasonable proportion of characteristic plants.

Ferns, in common with human beings, are benefited by a change from one part of the country to another. The writer attributes his first bumper crop of *S. v. crispum fimbriatum* (2,000 plants all of the very best type) to a removal from a cold damp sunless district to a drier air, sunnier and warmer conditions, and a limestone soil. We are all familiar with the general practice of importing "seed" potatoes from North to South. Scotch grown

tubers planted in Yorkshire, Lincolnshire, or Cheshire, produce a 30 per cent. better crop than tubers locally grown. The changed conditions appear to revivify and to bring into active operation certain capacities for growth and development which under the first set of conditions might have remained dormant for ever. The same thing holds good with ferns as with potatoes.

The sex feminine or neuter of bees can be regulated at will by giving a special diet whilst in the immature stage of development. This special diet stimulates the development of certain organs which otherwise would have atrophied or become abortive. If queen bees can by a diet of royal food be manufactured from prospective neuters, it would seem not improbable that the earliest conditions prevailing during fern life may have a deciding influence on the subsequent character of the plant. These observations are made with special reference to *S. v. c. fimbriatum*. If the deep cutting is not visible on the earliest fronds, there is little likelihood of its being acquired in later life.

There are some ferns which usually produce a proportion of pigmies in each crop of seedlings. *Blechnum spicant ramo-cristatum* is *facile princeps* as a pigmy producer. This tendency is so ingrained in the nature of the plant, that it is doubtful if any full crop of this fern has ever been brought forward which did not include more or less of the pigmy, *B. sp. Maunderii* among the brood. Another pigmy-breeding fern is *Scol v. crispum muricatum*. Mr. Lowe, some thirty years ago, exhibited a few sample fronds from pigmies of this variety, and every sowing of *S. v. muricatum* here in recent years has contributed its quota of about 2 per cent. of pigmies. Pigmies have also been raised from *A. f.-f. acrocladon*, *A. f.-f. gemmatum*,

Cyst. Dickieana, and most of the *curiosum* section of *Scolopendrium*.

Your readers may not all be familiar with *C. Dickieana crispa*. This fern appears to be now extinct, but was well known and much sought after forty or fifty years ago. It is a fern of an intensely dark but vivid shade of green, and grows not more than two inches. It will undoubtedly reappear sooner or later if the parent is persistently and extensively sown.

H. STANSFIELD.

WINTER AND SPRING WORK.

The present mild winter is, on the whole, favourable to ferns, both in the open air and under glass. The fronds of the evergreen species remain fresh and continue to perform their vegetative functions, so that the fronds of the coming season, now being formed, are more thoroughly elaborated than if the old fronds had been destroyed in the autumn. The danger is from a too early start, and a subsequent check from frosts in April and May. To guard against this, frames and houses should be opened freely to prevent rise of temperature from imprisoned sun heat. Ferns in the open may be kept back to some extent by covering roots and crowns with a layer of dry leaves so as to prevent the premature stimulation of growth by the direct heat of the sun. Take care that ferns under glass do not suffer from dryness. The roots are active and water is required, though less, of course, than during the season of rapid growth. Slugs and snails are more or less alert during the mild weather, and can be trapped by laying down cabbage leaves or pieces of board or slate, under which the vermin will shelter during the day. There are also some hibernating

specimens of the green and white fly which are only waiting the coming of slightly warmer weather before beginning to feed and multiply. An occasional syringing of the undersides of the fronds of evergreen ferns, and of the crowns of deciduous species, with insecticide (abon, nicotine soap, etc.) will well repay the trouble by killing these advance guards of the hosts of vermin. The insecticide can be applied now in stronger solution (say double strength) than when the fronds are growing, and so may kill even eggs under some circumstances. It will, in any case, render the fronds distasteful or poisonous to the newly hatched larvæ.

F. W. S.

FERNS IN GEOLOGICAL AGES.

Translated (and abridged) from Correvois's "Fougères Rustiques" by H. STANSFIELD.

In examining the various strata of the earth's crust, we find printed as in the leaves of a book, the history of the development of organised beings. We now know that the vegetation which covers our globe has very often changed in aspect and in nature since the appearance of the first plants in the waters of the Cambrian Period. Represented at first by very simple forms (*fuci and algæ*), vegetation has later assumed forms diverse and varied. These simple forms of vegetable life were (after or during the lapse of countless ages) succeeded by more complex types, the changes, of course, being very gradual and imperceptible. Later still, the world continued to alter and develop. The land appeared, and under the influence of an atmosphere saturated with moisture and surcharged with carbon dioxide, there grew to immense heights and in the form of giant trees, the ancestors and predecessors of the lowly

ferns and mosses of our woods at the present time. During a long series of ages vegetation assumed exaggerated and grotesque forms, and took on gigantic proportions suggestive of our present-day ferns run mad, or as seen in some awful nightmare. Thanks to the heat which escaped from her steaming bulk, the climate of our earth showed no difference either in season or in temperature, the latter being at that time perfectly uniform from pole to pole, and very high in comparison with present-day temperatures. The fossils found in Spitzbergen and Greenland are therefore identical with those found in tropical countries. Vegetation was at that time entirely cryptogamic, and included nothing but acotyledonous subjects such as Filices, Lycopods, Equisetums, Lepidodendra, &c. Some Cycads appeared, however, towards the end of this period, probably when the sun's rays commenced to pierce the clouds, and to permit the development of plants better organised. In the semi-obscurity of an atmosphere charged with vapour, we can understand that cryptogams alone would be able to live and develop. The air at that time contained twenty times its present proportion of carbon dioxide, and flowering plants could not exist in the lower regions to which this heavy gas would naturally gravitate.

It is estimated that upon the summits of the mountains, which were then much higher than they are now, the atmospheric equilibrium would be first established and that plants resembling our alpine flora might there be able to live and multiply. We must therefore look to these mountain solitudes as the creating force of the phanero-gamic flora.

In the deep shade of the plains some Lycopods attained a height of forty yards. Immense Lepidodendra of fantastic appearance, enormous Equisetums (whose forms and extra-

ordinary dimensions appeared to give them a place apart from all others in the vegetable world, and of which the Equisetums of our woods and fields are the diminutive and infinitely small representatives) constituted the base of the vegetation of the coal period. In some coal fields fossil trunks have been found measuring forty feet in circumference, and belonging to plants of the Lycopodium family, that is to say, to a kind of moss! Is it possible that our humble and inconspicuous mosses of the present day have had for ancestors trees of such stupendous magnitude as the prehistoric giants in question? That the mighty have indeed fallen there is no room for doubt.

Little by little, all these plants—Sigillarias, Lepidodendra, Calamites, &c.—very abundant at the commencement of the carboniferous epoch, seemed to dwindle and diminish and to give place to the newly arrived ferns which predominated towards the end of this period. Ferns and mosses now reigned supreme, the former rearing their columned trunks higher than the tallest trees of our actual forests, and spreading the bewitching tracery of their graceful fronds through space as though in silent benediction of the dying denizens of the forest beneath.

More than 900 species of fossil ferns, in more than 160 families, have already been discovered and classified. Many of these species have now totally disappeared from the terrestrial flora, but some kinds still exist at the present time. The genus *Phegopteris*, which exists in Europe in a living state, belongs to these distant ages. Fossil specimens have been found which approach very nearly to our present-day *Cyatheas*. Heer mentions among others, *Pecopteris Cyathea*, which belongs to the carboniferous ages, and of which we still find similar forms in hot countries.

It is this vast vegetable mass which, thanks to the high

proportion of carbon dioxide contained in the atmosphere, has formed the coal. During this epoch when the air was saturated with carbon, animal life was almost non-existent upon the earth, because carbon dioxide, which is *par excellence* the life and soul of plants, is inimical to animal life. With the exception of reptiles, fishes, and some molluses, all the animal *debris* discovered amid the fossils of this period belong to primitive beings and simple organisms. The fiery air was then filled with suffocating vapours escaping from the soil. The earth was shrouded in thick clouds showing the high temperature of the soil, which converted to vapour much more water than is the case to-day.

This was the golden age for ferns—superb, they dominated the whole landscape, raising their stately heads in regal splendour towards heaven with grace and with majesty. Alas ! what has become of them, and why are these glorious queens of the coalfield vegetation fallen from their former high estate to one of humble dependence, seeking and begging the protection of trees and of rocks, and hiding themselves, timid and ashamed, at the feet of great trees ? Plants at one time among the ancestors of the vegetable world, appear now to fly and to hide themselves in the shade : they have suffered as from a curse and a degeneration.

Meanwhile, what beauty and grace ! What delicacy of outline and lightness in their graceful carriage and the stately grandeur of their magnificent foliage ! They are still full of charms these marvellous sirens of our woods.

Let us remember in seeing them now so humble and so small, that they once had an epoch of power and great glory. That this glory is immortal, and that it is preserved for the history of the vegetable world in the depths of those

black beds which they have so effectually contributed to form, and which are and will be in the future the sources of heat and of life, of which our present age, so old, decrepit and decayed, has so much need.

A GLOSSARY OF FERN NAMES.

ADIANTUM CAPILLUS-VENERIS

- admirabile*—to be wondered at, or admired.
- Cornubiense*—coming from Cornubia (Cornwall).
- Daphnites*—resembling a laurel (*Daphne*—a laurel).
- fimbriatum*—fringed.
- fissum*—cleft, split (*i.e.*, the pinnules).
- imbricatum*—overlapping like tiles (*imbrex*, a tile).
- incisum*—cut into, slashed, or cut through.
- kalon*—beautiful.
- optandum*—to be desired.
- plumosum*—feathery.

ASPLENIUM ADIANTUM-NIGRUM

- caulifolium*—(lit. tail-leaved) having the segments ending in tails.
- flabellatum*—fan-shaped.
- lineare*—very narrow segments (an extreme form of *acutum*).
- microdon*—having short or small teeth.
- ramosum*—branched (*ramus*, a branch).
- Serpentini*—from the Serpentine geological formation (a distinct round-lobed form found only on this rock in Scotland).
- variegatum*—particoloured.

ASPLENIUM CETERACH

- crenatum*—notched, cut with circular incisures (*crena*, a cranny).

ASPLENIUM FONTANUM

refractum—broken back, or bent downwards (*i.e.*, the pinnæ).

ASPLENIUM LANCEOLATUM

microdon—(as in *A. Ad. nigrum*).

ASPLENIUM MARINUM

imbricatum—tiled (pinnæ overlapping like the tiles of a roof). A typical example of this character.

lineare—segments narrow and supralineate.

multifurcatum—many-forked.

multiplinatum—literally, having many pinnæ. This variety, however, had a sub-bipinnate character.

plumosum—feathery; comparable to var. *Cambricum* in *Polypodium vulgare*. This, the finest variety of *A. marinum*, is almost, but not quite, extinct.

ramosum—branched (see under *A. Ad. nigrum*).

ASPLENIUM TRICHOMANES

bipinnatum—pinnæ again pinnate, like little fronds.

confluens—flowing together. The name is strictly applicable only to the upper part of the frond.

dendroideum—tree-like (really a *ramosum*).

depauperatum—poverty-stricken, lacking in parts.

imbricatum—(as in *A. marinum*).

ramo-cristatum—branched and crested.

ramosum—(as in *A. Ad. nigrum*).

ATHYRIUM FILIX-FÆMINA

abasilobum—lacking the basal lobe.

acuminatum—made sharp, drawn out.

acrocladon—with branching end (*akros*, extremity, and *cladon*, a branch).

amœnum—pleasant, agreeable.

angustum—narrow.

angustatum—made narrow.

ATHYRIUM FILIX-FÆMINA—*continued*

- adulterum*—of mixed blood.
anomalum—uneven (*i.e.*, deviating from the rule).
apicale—relating to the summit or apex (probably a figurative expression implying a superlative).
apioides—parsley-like.
apuceforme—fish-shaped (*apua* or *aphye*, a small fish).
arbusculum—a little tree.
attenuatum—made slender, drawn out.
brachiatum—furnished with arms.
brachypteron—short-winged (having short pinnæ).
calomelanos—dark and beautiful (“Black am I, but comely”).
canaliculatum—having little channels (in the rachis).
capitatum—having a head.
Caput-Medusæ—“The Medusa’s Head” (hair like snakes).
caudatum—tailed.
caudiculatum—having little tails.
caudigerum—bearing tails.
centiceps—hundred-headed.
cephalomanes—a thin or lax head (derivation slightly obscure, possibly means a large head).
ceratophyllum—horn-leaved (*i.e.*, fronds shaped like horns).
clarum—renowned, distinguished.
Clarissima—most distinguished. (Intended also to commemorate Col. Jones’s wife, whose name was Clara.)
Conioides—like Conium or Hemlock.
congestum—crowded, heaped together.
coronare—pertaining to a crown.
coronatum—crowned.

ATHYRIUM FILIX-FÆMINA—*continued*

corymbiferum—bearing a cluster or corymb.

crispatum—curled or wavy;

crispum—curled like hair.

cristulatum—lit. having small crests. (The variety in question has, however, relatively large crests; probably the name was intended to mean a dwarf *cristatum*.)

cruciatum—crossed (*i.e.*, with pinnæ that cross each other).

cruciferum—cross-bearing (a variant of above).

cymbaforme—boat-shaped (*Cymba*, the boat of Charon).

dactyliferum—finger-bearing.

dentatum—toothed.

depauperatum—impoverished (by loss of parts).

diffissum—cut up, split (*i.e.*, the ultimate segments).

digitatum—fingered.

dilatatum—enlarged, widened.

dispar—unequal, irregular.

divaricatum—spread asunder, stretched apart.

echinatum—furnished with spines like a sea-urchin (*Echinus*).

excurrens—running out or projecting (*i.e.*, the midrib).

exiguum—scanty, limited.

exile—thin, meagre.

fimbriatum—fringed.

flabellatum—fan-shaped.

flabellipinnulum—having fan-shaped pinnules.

flexuosum—full of turns, repeatedly bending.

fœcundulosissimum—very fertile, producing *small* bulbs very freely.

formosum—finely formed, handsome.

foliosum—leafy.

ATHYRIUM FILIX-FŒMINA—*continued*

furcillans—forking slightly.

furcillatum—having small forks.

gemellipara—twin-bearing (alluding to the cruciate or twin pinnæ).

gemmatum—decked with gems.

glomeratum—gathered into balls or knots.

gracile—slender.

gracilissimum (properly *gracillimum*)—very slender.

grandiceps—with a large head.

grandidens—large-toothed.

gratum—pleasing.

inæquale—unequal, irregular.

incongruum—inconsistent.

kalon—beautiful.

kalliston—most beautiful.

kalothrix—beautiful hair.

laciniatum—jagged, pleated, full of folds.

latifolium—broad-leaved.

limbospermum—having spores on the edge or border.

lineare—narrow, line-like.

lunulatum—having little moons (*i.e.*, the circular pinnæ).

magnicapitatum—having a large head.

magnificum—enlarged, specially fine, magnificent.

marinum—relating to the sea.

medio-deficiens—lacking in the middle.

minimum—very small.

mirandum—to be wondered at.

multiceps—many-headed.

multicuspe—many-pointed.

multifidum—split into many parts, or very much split.

multifurcatum—many times forked.

ATHYRIUM FILIX-FÆMINA—*continued*

nanodes—dwarfish.

nanum—dwarf.

nodosum—knotted. (The opposing pinnæ resemble little bows).

nudicaule—naked-stemmed.

orbiculatum—round, globular.

omnilacerum—torn or rent throughout.

pannosum—ragged.

parviceps—with a small head or crest.

paucidentatum—having few teeth.

percristatum—crested all through (*i.e.*, pinnules crested).

plumosum—feathery.

polydactylum—many-fingered.

polymorphum—having many forms.

proteum—assuming many forms (like the mythical Proteus).

proteoides—Proteus-like.

pterophorum—wing bearing.

pulchrum—beautiful.

pulcherrimum—very, or most beautiful.

ramosum—branched.

ramo-cristatum—crested and branched.

ramulosissimum—having many small branches.

reflexum—bent backwards.

rectangulare—right angled.

regale—royal.

refractum—broken or bent backwards or downwards.

reticulum—like a little net.

revolvens—rolling backwards.

Rhæticum—from Rhoetia in Switzerland.

[*To be continued.*]

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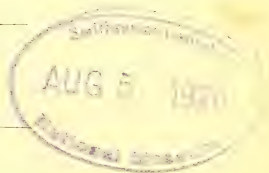
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EDITORIAL NOTES.

ANNUAL GENERAL MEETING.

The Annual General Meeting of the Society will be held at Webb's Temperance Hotel, Kendal, on the 2nd of August, at 12 o'clock noon, when the Audited Accounts will be presented and matters of great importance brought forward.

Accommodation for a limited number of members has been secured at the above Hotel—those desirous of being present will please communicate with the Honorary Secretary at the earliest possible moment.

As this is the first meeting which has been held since the War, it is hoped that a representative gathering will muster.

The usual Fern Hunting Excursions in the district will be organised, in which it is hoped that as many members as possible will participate.

Mr. B. Wall, of Grimsby, writes that he spreads his spent hops in the sun for a few days and that they can then be mixed with soil and used as leaf mould in the ordinary way. Spent hops can often be obtained more cheaply and easily than leaf mould, and may be very useful to the town or suburban dweller. Nevertheless, where good oak leaf mould is accessible most fern growers will probably prefer to use it.

Mr. F. Burton, Roughetts, Hildenborough, Kent, sends a frond of a crested or polydactylous form of *Lastrea filix-mas*, which he has found in Kent, in a district where "in a wood of about 50 acres there are about two ferns to the acre, and these *L. filix-mas*." The variety is a neat and symmetrical one, having nothing of the irregular and depauperate character so often found in variations of this species.

Our member, M. R. de Litardière, of the Institut de Botanique, Louvain, is working at the Cytology of Ferns, on which he proposes shortly to publish a pamphlet. We congratulate our member upon his choice of a subject, and the town of Louvain upon getting to scientific work again so quickly after the cruel devastation to which she has been subjected.

The steadily mounting costs of printing and paper necessitate the continued publication of the GAZETTE in a severely restricted form. More subscribing members, or an increase in the amount of the subscription, will be necessary before the GAZETTE can return to its former bulk and usefulness.

Members who have not paid their subscriptions will oblige by sending a remittance at once to the Hon. Secretary, Mr. W. B. Cranfield, East Lodge, Enfield Chase, Middlesex.

CHOICE BRITISH FERNS (DREURY). (CORRECTIONS.)

The following mistakes—some were printers' errors and others probably due to hurry or inadvertence—were mostly pointed out to Mr. Dreury immediately after the book was published, and would doubtless have been corrected in a future edition had the author lived to produce one. As, unfortunately, he did not do so it is well that they should be pointed out now lest the errors should be copied and perpetuated.

- On page 105. *Athyrum f.f. Huckii* ; for West Steddale read *Wet Sleddale*.
- On page 109. *A. f.f. nodosum* is not synonymous with *A. f.f. Friselliæ* as stated, but was a cruciate form raised from *Pritchardii*.
- On page 113. *A. f.f. plumosum*, Horsfall : for Skipworth read *Skipwith Common*.
- On page 132. *Blechnum sp. trinervum coronans*, Barnes has "nothing to do" with *multifurcatum* and was never known by this name. The only synonym of *trinervum coronans* is *brachiato-cristatum* (Wollaston). *Multifurcatum*, Symons was, however, occasionally brachiate, but was a poor thing and is probably not now in cultivation. *Trinervum coronans* is correctly figured and named in the Appendix, page 290.
- On page 133. *Blechnum sp. paradoxum*. For Ramsdale read *Banisdale*.
- On page 144. *Lastrea dilatata cristata-gracile* should be *cristata-gracilis*.
- On page 154. *L. propinqua gracilis*, Forster was originally named *gracilis furcans*, the pinnæ having forked tips.

- On page 154. *L. propinqua Pinderii* should be placed under *L. pseudo-mas (paleacea)*.
- On page 155. *Lastrea pseudo-mas abbreviata cristata* should be *L. propinqua cristata*; *abbreviata* is merely a synonym of *propinqua*.
- On page 159. *L. montana grandiceps*, Smithies: for Long Seddale read *Long Sleddale*.
- On page 159. *L. montana plumosa*, Mr. Barnes's form (thought by some to be the best) is omitted. *L. m. plumosa Stansfield* was found in 1908.
- On page 163. *Lastrea spinulosa* is well marked off from *L. dilatata* by its creeping rhizome and concolorous scales.
- On page 182. *Polypodium v. multifido-cristatum* was found by Mr. Parker, not Tasker. The correct history is given on page 180 under *grandiceps*, Parker, of which *multifido-cristatum* is Moore's original name. *Grandiceps*, Parker, although as much better name, was given years afterwards by Wollaston.
- On page 191. *P. aculeatum gracillimum cristulatum* and *P. plumosum*, Green have nothing to do with *P. acul. pulchrum*, but should be placed under *P. acul. pulcherrimum*. The name *cristulatum* is a misnomer, as the variety is not really cristulate although it sometimes simulates this character by its dilated apices.
- On page 197. *P. angulare decompositum splendens*, Moly., "parent of the plumose strain raised by Col. Jones and Dr. Fox." This legend is now exploded; the real parent was *decomp. splendens*, Jones.

On page 198. *P. ang. depauperatum*. This is really a *lineare* which has "gone blind" and not recovered its strength.

On page 200. *P. ang. grandiceps*. "Origin obscure." The correct history is given in Appendix, page 382.

On page 203. *P. ang. Kitsoniae*. "Miss Annie Kitson" should read Miss *Fanny* Kitson. The variety was really a *brachiato-cristatum*, and the frond figured is not fully characteristic.

On page 211. *P. ang. proliferum Crawfordianum*. This is the original name, but the variety is really a *divisilobe* and not an *acutilobe*. It was not found by Mr. Phillips, but was collected unwittingly by one of Miss Crawford's gardeners who was sent out to "get some ferns." The figure is not at all characteristic of the variety, which is one of the best wild finds of this section.

On page 212. *P. ang. ramulosum*. "Mr. J. Stansfield" should read Mr. T. Stansfield.

On page 224. *Pteris aquilince grandiceps* is not "always barren." We have recently raised a large crop from spores of the original, the seedlings being true to character.

F.W.S.

THE SECTIONS OF *P. ANGULARE* VARIETIES.

The late Colonel A. M. Jones and Mr. Wollaston made an attempt to classify the then known forms of *angulare*, more especially the divided forms of normal outline. These were classed as *plumosum*, *foliosum*, *decompositum*, *multilobum*, *conspicuilobum*, *acutilobum* and *divisilobum*. Their classification has been adhered to by subsequent pterido-

logists, though it must be confessed that it is often difficult to draw the line between the various groups of varieties. *Plumosum* and *foliosum* are both characterized by increased size of the pinnules, *plumosum* being separated from *foliosum* by the thinner texture and by the absence or abnormality of the sori. The two original wild *plumosums* were Elworthy's and Wollaston's, which have a general resemblance to each other; but while Elworthy's form is barren of spores, Wollaston's is fertile, but has the sori naked or nearly so, *i.e.* the indusia, when present, are imperfect. Moly's *plumosum grande* is thicker in texture than the others but is quite barren; it is one of the noblest of British ferns. *Pateyii* is perhaps the most typical *plumosum* found wild and was long supposed to be barren, but has since been found to be occasionally fertile, the sporangia being scattered and devoid of indusia. Up to the present Elworthy's and Moly's forms are the only *angulare plumosums* upon which spores have not been recorded. The *decompositums* are simply very much divided forms of normal outline and texture, and they are all fertile. They differ from the multilobes, acutilobes and divisilobes in not having the segments contracted at their bases. The *acutilobums* are distinguished by the sharp cutting and more or less contracted character of the ultimate segments. In a few cases the pinnules are not cut down to the midrib, but are simply cut into lobes which are contracted at their bases and very acute at their apices. This is the simplest type of acutilobe and may be taken as the primary form of the section. One of this character was found by the writer in 1916. In the majority of cases, however, the pinnules, besides being acute, are completely divided into subsidiary lobes or pinnulets. These may be called the compound acutilobes, and are only distin-

guished from the true divisilobes (according to Wollaston's definition) by the upper and lower pinnules being of approximately equal length, while in the divisilobes proper the lower pinnules are considerably longer than the upper. This is rather a weak point in Wollaston's classification because it is manifestly often difficult, and sometimes impossible, to draw the line between the two sections, since a fern which, under some conditions, appears to be an acutilobe may, when given better treatment, become a divisilobe and the same plant may have fronds some of which are of acutilobe and some of divisilobe character. Had Wollaston restricted the term acutilobe to those varieties which have acute lobes but not divided pinnules and given the name divisilobe to all those having completely divided or compound pinnules, his classification would have been more logical and in accordance with the literal meaning of the words, but the acutilobe section would have been very small and the divisilobe section very large. It is well for us, while adhering to Wollaston's classification, to bear in mind the distinction between what I have called the simple and the compound acutilobes. The multilobes and conspicuilobes have contracted lobes of a rounded character, *i.e.* they lack the sharp points of the acutilobes. With this exception they agree in character with the latter, the conspicuilobes being simple in construction while the multilobes are compound. Moly's *manica-infantis* (Wollaston's name) may be taken as the type of a conspicuilobe, the pinnules being entire with the exception of one lobe, which juts out like the thumb on a baby's glove in which the fingers are united. The *pulcherrimums* constituted a very small section in Wollaston's time, only some half-dozen forms being known, and these mostly of intermittent character. They were considered

to be *ultra plumosum*, although in nearly all of them the upper pinnules were normal, the lower ones being very finely divided, long and sickle-shaped. Of the forms then known only two remain, both found by Moly. Both of these were faulty originally, the green one having a proportion of normal fronds and also some normal pinnæ mixed with those of true character, while the variegated one was spoilt by a tendency to depauperation of the upper part of the frond. Attempts have been made to correct these defects, successfully in the case of the green one and with partial success in the case of the variegated one. Other *pulcherrimums* have, however, been raised from spores, which are not only constant in character all through but have the upper as well as the lower pinnules of true type. Of these more anon. F.W.S.

A FERN HUNT IN KILLARNEY.

Although claiming two generations of fern-hunting ancestors, we cannot say that we ever took kindly to this branch of the fern cult. Either through lack of persistence, or sheer bad luck, the fact remains that the whole of our finds during the last 50 or 60 years (a fairly long apprenticeship) are as valueless as the proverbial itinerant white-smith's imprecation. But hope springs eternal in the fern-hunter's breast, so, undeterred by former non-successes, we decided to have a week's hunting in Killarney, leaving an efficient *locum tenens* in charge of our rather numerous fern family.

Should any of our friends feel inclined to sample this ground, our advice would be that he lay well to heart Iago's instructions to Roderigo, to "put money in thy pocket"—a very necessary precaution indeed.

Feeling the necessity of a refresher during the long

railway journey, we were rejoiced at seeing Victoria plums on sale at the various railway stations, and found the unsophisticated natives more or less content with a modest profit of 800 per cent. on English retail prices. However, we reached our destination eventually without loss of life, and proceeded to make arrangements for the following day.

Next day, the weather being perfect, we chartered a vehicle for a day's drive through the country anywhere. Our Jehu could not have been one of the sons of Nimshi, as his driving was the reverse of furious, but that was an advantage from a hunter's point of view. One of the disadvantages of Killarney is that one is faced with a 10-ft. wall on each side of the road wherever one goes. It is only when driving through the various estates (we should call them woods in England) that we get rid of these objectionable walls. Finding ourselves miles from anywhere and surrounded by unlimited stretches of strong *L. æmula*, we suggested a halt in order to secure a memento in the shape of a plant of *L. æmula*. Our driver, however, although having no objections to a halt, had very decided ideas on the rights of property, and begged to remind us that the ferns belonged to Lord So-and-So, and he pointed to certain notices to the effect that ferns were not to be taken away.

"Does his Lordship want all these ferns?" we asked. "He wants everything that belongs to him, sorr," replied our driver, who proved so incorruptible that he might have been the landlord himself in disguise, so zealous was he in his Lordship's behalf.

Not wishing to place ourselves on a lower moral plane than that assumed by this son of Erin, we made a virtue of necessity and, for the time being, kept our hands from picking and stealing.

Going out on foot next day we found ourselves in a land of *Aspleniums*. Walls and banks draped with millions of *A. trichomanes*, *Ceterach*, *A. ruta-muraria*, *A. ad.-nigrum*. Many nice multifid forms of *A. trichomanes* were noticed, but no improvements on existing varieties. We examined some thousands of square yards, hoping to find something worth stealing, but found nothing. *P. v. semilacerum* was occasionally seen; *Ceterach* was very fine, and quite plentiful even close to the village. *Scolopendriums* were not really plentiful, although very vigorous specimens were occasionally noticed. Beautiful cone-bearing *Araucarias* were met with, whilst *Chamerops humilis*, *Dracena Australis* and *Eucalyptus* imparted a sub-tropical look to the landscape. *O. regalis*, *Allosorus*, *Lycopodium selago* and *clavatum* and *Pinguicula vulgaris* were all more or less plentiful.

We were anxious to see *T. radicans*, but could not find a breach in the fortifications to allow us to approach really favourable hunting ground. We made enquiries from native boatmen as to where we should be likely to meet with the plant, but an atmosphere of suspicion was immediately created, which our most fervid eloquence was powerless to dissipate. We assured these worthies that we only wished to *see* the plant growing wild and not to rob the habitat. Our assurances that we had sufficient stocks at home to plant the road from here to *Avernus* and back did not tend to improve our case. "If you only wish to *see* it, you will find a plant in a fern case in Kate Kearney's cottage," said Paddy. It was in vain that we reiterated the fact that our hearts did not yearn towards seeing the plant in captivity, but that we were prepared to pay liberally for an introduction to its native haunts. However, no business was done. "Corrupting gold" might

have "tempted these men to a close exploit with death," but life is cheap in Ireland when weighed in the balance against T. radicans.

We found the crowds of sturdy beggars a perpetual nuisance. It was difficult to walk very far without being besieged by a clamorous horde of banditti, whose ceaseless appeals for "backsheesh" were a source of considerable annoyance. Begging appears to be considered an honourable and legitimate means of livelihood.

Towards the end of a long day's walk we found ourselves feeling very fit, and attributed this apparent rejuvenation to the exhilarating properties of the atmosphere and the beauty and novelty of our surroundings. We discovered later that this apparent buoyancy was due to the fact of our having shed the whole of the bronze currency with which we started heavily laden in the early morning.

Finding our progress barred by a Bardolphian-visaged ruffian of sinister aspect, who was improving the shining hour by importuning all and sundry *in forma pauperis* for "backsheesh," we endeavoured to explain to him that in consequence of the persistent demands of his fellow brigands in the rear we had now not a single denarius in our treasury, and might, from his point of view, be considered absolutely impecunious. He suitably expressed his deep concern, and hinted that locomotion would be found tedious unless the wheels of progress were thoroughly and persistently lubricated by a steady and unstinted flow of "backsheesh." In the legitimate exercise of his vocation he found himself temporarily encumbered with an embarrassing accumulation of bronze coinage which he would gladly exchange for its equivalent in silver or paper currency, to our mutual advantage. With strict economy, he estimated that half-a-crown (exclusive, of course, of the regular tolls) ought to

see us through. We produced the half-crown, which our Hibernian friend pocketed in an absent-minded manner, and proceeded to interrogate his next client.

Had we obeyed the promptings of our baser nature the *contretemps* might have had a sanguinary termination, but to "ope the purple testament of bleeding war" and "deface the precious image of our dear Redeemer" formed no part of our programme, and "chastisement did therefore hide its head."

The hunt was on the whole a most delightful one, although the result as regards new ferns was nil.

To anyone interested in Spleenworts we can confidently recommend this ground as most promising. Many slight variations of *Asp. ad. nigrum* were observed, and only careful hunting and good eyesight are needed in order to make a decent bag.

H. STANSFIELD.

[Thanks : we are not taking any at present—ED.]

A GLOSSARY OF FERN NAMES.

(Continued.)

ATHYRIUM FILIX-FÆMINA—*continued*

sagittatum—arrow-shaped.

scitum—elegant, fine.

setigerum } —bristle-bearing.
setiferum }

stellatum—star-shaped (*i.e.*, the pinnæ).

stipatum—crowded, condensed.

strictum—drawn together, narrow.

strigosum—lank, thin.

tenue—slim, slender.

thyssanotum—furnished with tassels.

todeoides—Todea-like.

tortum } —twisted.
tortile }

truncatum—cut off abruptly.

umbraculiforme—umbrella-shaped.

uncum—hooked.

velutinum—woolly or velvet-like. (A modern word, botanical Latin; Italian *velluto*, velvet; akin to *villosum*, woolly.)

BLECHNUM SPICANT

anomalum—irregular.

apiculatum—having a little point or apex.

bellum—beautiful.

biceps—having two heads.

bifidum—cleft into two.

caudatum—tailed.

cladophorum—branch-bearing.

concinnum—neat, pretty.

confluens—flowing together (*i.e.*, the pinnae).

conglomeratum—crowded together, like a ball.

contractum—narrowed (at base).

coronans—crowning.

crispissimum—very curly.

cristatum—crested.

cristato-gracile—crested and slender.

crispum—curly.

curtum—short (*i.e.*, the pinnae).

elegans—choice, elegant.

flabellatum—fan-shaped.

furcans—forking.

heterophyllum—various-leaved (having irregular pinnae).

imbricatum—see under *Asp. marinum*.

lanceifolium—lance-leaved, having a long, pointed tip.

lineare—very narrow.

- longidactylum*—long-fingered.
multiforme—having many shapes.
multifurcatum—many times forked.
obovatum—egg-shaped reversed.
paradoxum—contrary to expectation, surprising.
parviceps—having a small head.
plumosum—(see under *Athyrium* f.f.).
polydactylum—many-fingered.
projectum—jutting out (some of the pinnæ project beyond the rest).
ramosum—(see under *Athyrium* f.f.).
revolvens—(see under *Athyrium* f.f.).
rotundatum—rounded (pinnæ).
semilacerum—half-torn, cut part away.
serra—a saw.
serratum—saw-toothed.
serrulatum—small saw-toothed.
strictum—narrow, contracted.
subserratum—saw-toothed on lower sides of pinnæ.
superbellum—more than beautiful.
trinervium—three-pronged (equals *brachiatum*).
tripinnatum—having the pinnæ twice divided, thus making *three* divisions of the frond in all, the pinnæ themselves being the first division.

LASTREA DILATATA

- alpina*—belonging to the Alps or other high mountains.
angustipinnula—having narrow pinnules.
collina—belonging to hills.
crispata-cristata—curly and crested.
crispa—curly.
cristata—crested.
cristata-gracilis—crested and slender.
cruciata-pinnula—having cross-like pinnules.

- dumetorum*—belonging to thickets.
ebeneum—black and polished (like ebony).
fastigiata—peaked or pointed like the roof of a house.
foliosa-cristata—leafy and crested.
glandulosa—set with small glands.
grandiceps—having a large head.
grandidens—having large teeth.
lepidota—scaly.
micromera—having small parts (*i.e.* finely dissected).
ochracea—ochre-coloured (yellowish).
parviceps—having a small head.
ramosa—branched.
setigera—bristle-bearing.
stenophylla—narrow-leaved.
succisa—(*lit.* cut off from below, *i.e.* at lower end), cut
off or cut down; the variety is a *truncata*.
tanacetifolia—Tansy-leaved (*Tanacetum*).
tenera—tender, delicate.

LASTREA FILIA-MAS.

- attenuata*—drawn out, slender.
concinna—neat.
confluens—flowing together (*i.e.* the pinnules).
crispata—curled.
crispatissima—very much curled.
cristata—crested.
decomposita—sub-divided on normal lines; excep-
tionally divided.
depauperata—impoverished, lacking in parts.
digitata—fingered.
erosa—as if gnawed or corroded.
fluctuosa—wavy.
gracilis—slender.
grandiceps—(as in *L. dilatata*).

linearis—line-like or pertaining to lines.

Lux-Lunæ—moonlight (alluding to the pale yellow colour).

multiformis—having many forms.

pendens—drooping, hanging.

platyphylla—broad-leaved.

polydactyla—many-fingered.

producta—(*lit.* led forward) having forward projecting pinnules.

ramosa—as in *L. dilatata*.

recurva—curved backwards.

tortuosa—twisting.

variegata—parti-coloured.

LASTREA PALEACEA (Don) [*L. PSEUDO-MAS*(WOLLASTON)].

angustata—narrowed.

crispa—curly.

cristata—crested.

fimbriata—fringed.

furcillata—having small forks.

grandiceps—having a large head.

nitida—shining, glossy.

pendens—drooping.

polydactyla—many-fingered.

pumila—dwarf.

ramo-cristata—branched and crested.

ramo-furcillata—branched and small-forked.

ramosissima—very much branched.

ramulosissima—having many small branches.

recurva—curved backwards or downwards.

revolvens—rolling backwards.

rotundata—having rounded pinnules.

subcristata—slightly crested, having small crests.

[*To be continued.*]

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British Fern Gazette.

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EDITED BY

F. W. STANSFIELD, M.D.

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THE BRITISH PTERIDOLOGICAL SOCIETY

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Enfield Chase, Middlesex.)*

*(Hon. Sec. Mr. Charles Henwood, 21, Clifton Road, Maida Vale,
London, W. 9.)*

KENDAL, WESTMORLAND.



A. F. F. KALOTHRIX LINEARE.

THE BRITISH FERN GAZETTE.

NEW SERIES

VOL. 4. JUNE AND SEPTEMBER, 1920.No. 6.

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EDITORIAL NOTES.

The Editor congratulates the Society upon the resumption of its annual meetings, and hopes that they may now be held regularly without further interruption by national or world convulsions. The increase in the annual subscription was inevitable from the alteration in the value of money caused by the war. It might, however, have been staved off a little longer had it not been for the neglect of some members to pay their contributions promptly and regularly. "Procrastination is the thief of time," and "Time is the stuff that life is made of." The reprehensible habit may even occasionally extend its depredations

to more material things than time, so that it is to be deprecated from every point of view. It would help the officials—all busy men—very much if members would pay their subscriptions during the month of August (when they are due) or, at latest, immediately upon receipt of the September GAZETTE. A slip from the Treasurer accompanies the present number, informing each member of the state of his account with the Society. Will members please note the address of the new Hon. Secretary, Mr. Charles Henwood. The address of the Hon. Treasurer is unaltered.

The Editor also begs for a little more help from members in the way of literary contributions to the GAZETTE. A larger number of contributors would add to the interest of the publication, because variety is the spice of life, and there must be more than half-a-dozen persons who have something of value to say to their fellow members.

OUR FRONTISPIECE.

ATHYRIUM F. F. KALOTHRIX LINEARE, H.S.

This extremely elegant fern probably represents the limit in the way of delicacy and refinement in a British fern. Owing to the difficulties of photography and reproduction the picture does not accurately represent the extreme delicacy of the ultimate segments. The pinnules are really little fans of radiating, glistening green bristles or hairs, which are only seen very imperfectly in the figure. The plant was raised some twenty-five years ago by Mr. H. Stansfield, and has only yielded two offsets, one of which went to the late Mr. Druery, while the second is the one represented, from Dr. Stansfield's collection. It is, so far.

entirely barren of spores. The cost of this picture will not be charged to the Society's funds : the regular issue of a pictorial frontispiece cannot be resumed until the finances are in a more stable condition, which desideratum, however, should not be long delayed.

OBITUARY.

BELL. We deeply regret to announce the death of our valued member, William Bell of Barrow-in-Furness, which took place on May 28th at the age of eighty years. Up to the beginning of the War, Mr. Bell was one of our most active and energetic members, rarely failing to attend a meeting of the Society, and taking an active part in all excursions. A severe illness in 1918 sapped his vitality, and he had been in poor health ever since, up to the time of his death. Mr. Bell added a number of varieties to the general stock of Ferns, perhaps his best find being his No. 2 bipinnate Polypody, found at Ulverston. This is a fine thing, approaching the well-known *pulcherrimum* of Atkinson in form and beauty. Another good find was a narrow crispate-foliose form of *Lastren Filix-mas* in the way of *L.f.m. Barnesii*. Our old friend's genial personality and cheerful presence will be greatly missed at our meetings.

STANSFIELD. It is also our painful duty to announce the death of Mr. Walter Stansfield (late Captain R.A.M.C.), of Manchester, the only son of our contributor, Mr. H. Stansfield, and a young medical man of amiable character and brilliant promise. His death took place on July 7th at Santa Cruz, Canary Islands, whither he had gone, on expert advice, in the hope of saving his life. His death is the direct result of the war, for, although not killed in

action, he contracted pleurisy while on military duty in Palestine, and this developed later into pulmonary tuberculosis. He leaves a young widow but no children. She, and his parents, will have the warm sympathy of all our members.

The Editor regrets to learn incidentally of the death of another member of the Society, Miss Salkeld, who took over the garden and collection of the late Mr. Barnes after his death, and whose garden has been more than once visited by members with interest and pleasure.

THE AUGUST MEETING.

After an interval of six years a General Meeting of the Society was again held at Kendal on August 2nd. Some fourteen members attended, representing both the North and South of England, as well as Scotland, but not Ireland. Several old friends were missed, some of whom will not be seen again, having gone to their long rest. Two octogenarians, however, were present, Messrs. Whitwell and Gott, both from Kendal.

Mr. Walton, of Richmond, sent for examination a series of fronds which called forth much interest. They were mostly *Polystichums (angulare)* of the *divisilobum* and *polydactylum* sections. Some of the latter were more thorough in their character than is usual in this section. A very elegant and symmetrical crested divisilobe was much admired, as also was a new and very good *cristata* form of *Lastrea filix-mas* having incised pinnules and heavy symmetrical lateral and terminal crests. The President,

Mr. Alex. Cowan, exhibited some interesting seedlings of varieties of *L. montana* raised by himself from mixed spores, including several densely-crested and narrow forms, and some showing crosses between the two sections. Dr. Stansfield showed fronds of several varieties of *P. angulare* found wild by himself and Dr. T. Stansfield in Somerset and Devon. There were two forms of *lineare*, both very distinct and symmetrical; two acutilobes (one of large size with lax divided pinnules and very sharp claws); and a *brachiatum* not yet fully developed. A frond was exhibited of a very fine bipinnate *Blechnum*, found near London by Mr. Charles Henwood, and one of a noble *angulare cristatum* found in Ireland by the Rev. E. H. Hawkins, of Stroud. Dr. Stansfield showed also a frond of *P. angulare plumosum rarefactum* (H. Stansfield), a splendid large-growing fern of very refined character, from which he had raised a number of quite new varieties belonging to the *plumose*, *super-plumose*, *plumose-divisilobe*, and *pulcherrimum* sections. Some seven of these were exhibited (fronds) and evoked much admiration, both on account of their high quality and their diversity of character. Other fronds exhibited were a well-grown example of *P. aculeatum pulcherrimum*, Druery, an improvement upon the well-known *pulcherrimum*, Bevis, while equalling it in vigour and hardness, and a frond of the corrected *P. angulare pulcherrimum*, Moly (green). The latter showed no normal pinnules, and was from a plant which bore no normal, nor partly normal, fronds. When first found, and for many years afterwards, this variety was only partly characteristic, usually producing 30 to 40 per cent. of normal fronds, while the best fronds usually had a few normal pinnæ or pinnules. The corrected plant is the finest example of *pulcherrimum* character at present known in *P. angulare*.

The Hon. Secretary's report showed that the membership had been fairly well maintained during the war and since. The Treasurer's report, while showing a balance at the bank, was noticeable for two issues of the GAZETTE unpaid for, which would leave a considerable deficit, due partly to the enormous increase in the cost of printing and paper for the GAZETTE, and partly also to the large number of unpaid subscriptions to the Society. It was thought that most of these were recoverable.

In view of the unsatisfactory state of the Society's finances it was resolved to increase the subscription from 5s. to 10s. per annum, but a saving clause was inserted to the effect that members of fifteen or more years' standing might have the option of continuing their membership at the old rate of 5s. A hope was expressed that as many of the old members as could reasonably afford it would voluntarily pay at the increased rate, so as to make the position of the Society financially secure.

Upon the election of officers for the coming year the President, Mr. Alexander Cowan, wished to lay down the office which he had held for some ten years. He proposed Mr. Cranfield as President. Mr. Cranfield had borne the burden of the offices of both Hon. Secretary and Treasurer since the death of Mr. Druery in 1918, and had nobly carried on the work of the Society, so far as this was possible, during the war. This was seconded by Dr. Stansfield, and carried unanimously. Mr. Cranfield was also elected Treasurer, while Mr. Charles Henwood, of London, was elected Hon. Secretary upon the proposition of Mr. Edwards, seconded by Dr. Stansfield. The names of Mr. Cowan and the Rev. Canon Kingsmill Moore were added to the list of Vice-Presidents, which had been reduced by the death of Mr. W. B. Boyd and of Mr. C. T. Druery.

The following is the complete list of officers :—

President and Hon. Treasurer.

Mr. W. B. CRANFIELD, East Lodge, Enfield Chase, Middlesex

Vice-Presidents.

Dr. F. W. STANSFIELD, Reading.

Mr. W. H. PHILLIPS, Holywood, Co. Down.

Mr. J. J. SMITHIES, Kendal.

Mr. ALEX. COWAN, Penicuik, Scotland.

Rev. Canon KINGSMILL MOORE, D.D., Dundrum, Ireland.

Hon. Secretary.

Mr. CHARLES HENWOOD, 21, Clifton Road, Maida Vale,
London, W. 9.

Auditor.

Mr. J. J. SMITHIES.

Committee.

Mr. T. BOLTON, Warton. Mr. H. RELTON, Garanew, Mon.

Mr. J. EDWARDS, Manchester. Mr. J. J. SMITHIES, Kendal

Mrs. GROVES, London. Mr. WHITESIDE, Lancaster

Mr. T. E. HENWOOD, Reading. Mr. WHITWELL, Kendal

Mr. W. WILSON, Kendal

(together with the President, Vice-Presidents and Hon.
Secretary as members *ex officio*).

Editor of GAZETTE.

Dr. F. W. STANSFIELD, Reading.

It was resolved that the meeting in 1921 should be held at Chard, Somerset, on the Monday *following* the August Bank Holiday for greater convenience of travelling and accommodation, subject to the district being found favourable on a preliminary survey by the President and Dr. Stansfield.

The members visited the gardens of Mr. Smithies and Mr. Whitwell (some also Mr. Gott's) in Kendal, many rare and interesting varieties being seen. Mr. Smithies showed

two plants of *P. aculeatum gracillimum* raised by him by apospory from the spreading tips of the frond. This is the first record of apospory in *aculeatum*. The aposporous offspring appeared to be absolutely identical with the parent *gracillimum*.

On several days before and after the Annual Meeting, excursions were arranged to Kentmere, Long Sleddale and Brotherswater. Many ferns were examined, the weather being, on the whole, fairly fine, except on the last day, Wednesday, August 4th. The only find of any importance was a curious form of *L. montana* by Mr. Charles Henwood on August 3rd at Brotherswater, a mixture of crispate and foliose or sub-plumose characters with a tendency also to confluent pinnules. The plant being not yet mature, it remains to be seen which of these characters will eventually take the lead. On the same expedition Dr. Stansfield found a neat imbricate *Blechnum* and Mr. Edwards a foliose form of *Lastrea propinqua*.

A copy of the Society's balance sheet is appended.

FERN PROPAGATION BY BULBILS AND BY DIVISION.

In an article on growing ferns from bulbils, which was published in the GAZETTE of March, 1918, I said "The causes which lead to the formation of bulbils are, so far as I am aware, obscure. Some species (and varieties) yield bulbils at an early age, while others take a long time, and, of course, there are many that do not yield them at all."

The title of the present article has been chosen, not with the view of adding to what I wrote in 1918 about the methods to be employed in raising ferns from bulbils, but in order to call attention to a relation which seems to

exist between the two methods of propagation—bulbils and division.

During the past season I found myself more at loss than ever to account for the production, or rather the non-production of bulbils. My collection of *P. A. plumosum* contains about two hundred specimens of all ages. Had the rates of progression noted in the last paper continued, bulbils would have been more plentiful than ever before. To my perplexity and surprise scarcely a bulbil appeared. Esplan's variety, of which I have seventy or eighty plants, gave not a single bulbil. Fox's variety, whose numbers are similar, did not yield half-a-dozen, it was the same with the rest. For some unexplained reason bulbils were not formed. Neither in the season nor in the appearance of the plants was there anything which to me suggested a cause. Rain in sufficient quantity had fallen throughout the year, and the collection as a whole had the appearance of vigour and health.

But while I failed to find bulbils, I soon became aware of an exceptional tendency to form second and third crowns fit in many cases for division. The number of crowns so formed greatly exceeded anything I had before experienced. It was not only that I had more divisions—an increasing collection would explain this—but the number of divisions available was much in excess of anything that could be explained by the increase in the number of plants. Taking this fact in connection with the absence of bulbils, it seems likely that there may exist some unexplained relation between the formation of bulbils and divisions. It is commonly held that *plumosums* are generally so busy with leaf formation that they can spare little or no energy for spore production. Possibly a fern which is bearing bulbils has little time for forming divisions, and, *vice versa*,

where attention is turned to the serious undertaking of building up new crowns, the work of bulbil making goes into the background.

At the request of our Editor I shall devote the conclusion of this note to setting down some of my experiences in dividing ferns. The process is not without its dangers. In his article on "A Tripennate Fern," Vol. III., p. 263, Dr. Stansfield, in recording a division which unhappily proved fatal, exclaims "Alas ! the fatal knife." Some of my divisions this year merited a similar sigh. There are of course, conditions where no trouble arises. If we are given well defined crowns whose boundaries are plain, a suitable time of year, and a species which lends itself to division, the knife need not be feared. So soon as the crowns are severed the roots of each can be gently disentangled—a better plan than passing the knife right down till roots as well as crowns are cut in two—and growth will continue even better than before, as there will be no interference with the development of the fronds. When however the crowns are intermingled, five or six, or even more together, the operation becomes complicated. Owing to the way in which the fronds interlace it is not easy to see where one crown ends and another begins. In such cases it is perhaps better to be satisfied with saving the principal crowns ; these can be readily cut out, with a sufficient supply of roots for each ; whereas an attempt to take all may mangle several, and leave all with insufficient root sustenance.

With regard to the right season for dividing, I have had some disasters from separating crowns just as they were beginning to unfold. At any other time good results may be expected if the operation is, as the doctors say, "successfully performed." The fern surgeon, however, is likely to

limit the phrase to cases in which the subjects are expected to survive ; in this he will differ from some, at any rate, of the medical profession.

[It is doubtless true that, broadly speaking, there are "black sheep in every flock" but the late "Dr." Crippen's name was *not* on the British Medical Register.—EDITOR.]

Marked differences are noticeable in the way different species accept division. The lady fern, *Athyrium filix-fœmina*, is astonishingly tolerant of the knife ; not only may divisions be made with little or no risk, but a ball of roots may be reduced by one-half, or more, without any apparent effect on the plant. *Lastreas* also divide easily, but they do not rival the lady fern in allowing liberties to be taken with their roots. Less indulgent in my experience are the *Polystichums* : like the others they can be, and indeed ought to be, divided, where perfect specimens are desired, but for success they require careful handling and a restricted choice of season. Late autumn, when frost is not a danger, or *early* spring are the times I recommend.

H. KINGSMILL MOORE.

[It is obvious that the processes of making crowns and producing bulbils are essentially the same, differing only in the size and situation of the buds produced. Consequently the one must be, more or less, at the expense of the other. We have known the free production of bulbils to cause the main crown to go blind, all the vital energy of the plant being directed to the bulbils. We have recently had to pick out bulbils with a knife in order to preserve the main crown from extinction, which operation appears to have been successful ; some, even, of the bulbils survived, although not "expected" to do so. Also when the main crown is breaking up into several there is a smaller tendency to the formation of bulbils.—EDITOR.]

OPHIOGLOSSUM VULGATUM AND ITS REPRODUCTION.

This plant, often regarded as the ugly duckling among ferns, was formerly considered rather an intractable subject, difficult to transplant, and difficult to grow. A superstition was current many years ago to the effect that grass was in some way necessary to this fern's existence, and that the plant was parasitic on the roots of the grass. This is, however, incorrect, and grass is not necessary to its successful cultivation. The apparent difficulty in transplanting this fern is due to its deep-rooting habit, the roots and crown being at a depth altogether disproportionate to the size of the plant, and it not infrequently happens that in lifting the plant the roots and crown are left behind in the ground, when, of course, the frond soon dies. It possesses a sort of running rootstock, and is thus able to travel long distances underground.

It is one of the few ferns which the writer has not yet succeeded in raising from spores, although he has sown every year for twenty years, in every conceivable kind of soil, simply as a matter of duty and with a view to exploring in "Nature's infinite book of secrecy," always hoping for a happy issue, but always disappointed.

Recently conducted investigations prove that the germination and subsequent fertilisation of *Ophioglossum* and *Botrychium* form one of the most interesting and fascinating chapters in the whole history of fern life.

The reproduction from spores of ferns in general was a sufficiently complicated operation in all conscience, but the reproduction of the two above-named requires the presence and active co-operation of a certain microscopic fungus of a comparatively low type, which has not yet been definitely identified. The spores of these ferns, which are very

minute, are washed into the soil by the rain. When the fungus is present it attacks and pierces the spore. Under ordinary circumstances such conduct would be resented, and would tend to the destruction of the organism thus attacked. In the present case, however, it appears to provide the necessary stimulus to enable the spore to germinate, and to form a prothallus, so that the ordinary routine of fertilisation can be proceeded with. Unless the fungus is present in the soil, germination is impossible, and the spores rot in the ground as surely as would birds' eggs under similar conditions. It is, therefore, quite useless to sow in ordinary sterilized soil. It has not yet been ascertained whether this interdependence is mutual. The fern spore appears to be the host and the fungus the guest. The presence of the guest is absolutely necessary to the existence of the host from a reproductive point of view. Quite possibly the guest may be able to quarter himself on the roots of the various grasses with which these two ferns are usually associated, only calling upon the ferns casually as a sort of change or relaxation.

The subject is a very interesting one, and should any of your readers meet with very young *Ophioglossum* (the younger the better) it might be possible to find vestiges of the prothallus by careful examination of the base of the plant. The prothallus is formed underground, and resembles a small potato. It has recently been the writer's privilege, through the courtesy of Professor Lang of the Cryptogamic Department, Victoria University, Manchester, to inspect a number of specimens of *Ophioglossum* with prothalli attached. These were preserved in spirit. Highly magnified drawings and photographs of the spores, showing the fungus at work, and its effect on the spores, were also seen.

H. STANSFIELD.

CULTURE OF ROCK-FERNS

A CONVENIENT METHOD.

We have recently observed, under cultivation, a phenomenon which gives a useful hint for the culture of delicate *Aspleniums*, *Woodsias*, &c. A plant of *Blechnum sp. plumosum*, Forster, was growing in a pot which had been plunged inside a larger pot, the intervening space being filled with soil which consisted mainly of coco-nut fibre refuse. In the interstice thus formed a couple of *Aspleniums* sprang up self sown, viz. : *A. Ad-nigrum multifidum* and *A. trichomanes bipinnatum*, and these grew with such vigour as to quickly form strong plants and to compete seriously with the *Blechnum* in the struggle for space. We have since acted upon this hint by placing a small pot, containing soil, inside a larger one, and, between the two, some suitable soil in which are planted various small-growing and delicate *Aspleniums*. The soil in the *inner* pot is regularly watered, the *Aspleniums* being thus supplied with moisture chiefly by percolation through the pores of the pot, which is sufficient in periods of comparative rest. It will be an easy matter to give the whole structure a thorough soaking occasionally during rapid growth and in hot weather.

F. W. S.

DEFECTIVE FERNS AND THEIR CORRECTION.

Apart from the host of *depauperatums* and *irregulares*, &c., most of which have been discarded by fern growers, there are many ferns which have high qualities of beauty and distinction, but which are cursed with some fatal flaw or

irregularity which keeps them out of the highest class. The defect may be of form, or simply of constitution, but the result is the same in either case—the plant is inherently unsatisfactory to the connoisseur although it can be tantalizingly beautiful when the defect is not in evidence, or even in spite of it. An example of the correction of one of these defective ferns is mentioned on another page. (The August Meeting—*P. ang. pulcherrimum*, Moly.) It still remains to be seen whether the amendment will be permanent.

Asplenium Ad. nigrum grandiceps is defective chiefly by reason of its poor constitution. When it can be persuaded really to thrive it is a very fine fern. *A. trichomanes bipinnatum* is unsatisfactory from its tendency, even when well grown, to revert almost to the normal form. When seen at its best it is a most striking and handsome fern. One plant, in the collection of Mr. Henwood, keeps its character even when in poor condition, and it is hoped that a permanently constant strain may be raised from this. Mr. Whitwell also has a plant in fine character. That lovely fern, *Athyrium f.f. kalothrix* shows a tendency to produce occasional pinnules or pinnæ of a coarser form, but, if the plant be well treated, these faults are so rare as not to be noticeable. *A. f.f. Clarissima*, the noblest of Lady Ferns, is perfect in the original, but the aposporous offspring all show a greater or less tendency to twisting and crumpling of the fronds. This is largely due to the greater breadth of the fronds in proportion to their length as compared with the original. The tendency to twisting can be minimized by good cultivation with plenty of room for the fronds, but the children are probably never *quite* the same as the splendid and perfect original. Elworthy's *Cystopteris fragilis cristata* is a plant of very unstable

character as regards the amount of the crestring. It varies from a *grandiceps* to a *furcillata* at different times. It is constant in its inconstancy, but would be greatly improved if a definite character of *cristata* or *grandiceps* could be fixed. The only hope of this appears to be from raising seedlings with careful selection of the best. *Lastrea dilatata cristata-gracilis* is a pretty and graceful fern in the young state, but, as it approaches maturity, invariably assumes an irregular character, some pinnæ or pinnules being depauperate or missing. If this fault could be cured it would be one of the most elegant forms of this species. *L. f. mas Bollandiae* is another example of a beautiful and unique fern spoilt by a tendency to depauperation. Although found more than sixty years ago this remains the only plumose form of *filiX-mas*. As it produces offsets freely and spores very sparingly, it has not been much sown and, indeed, is grown less than it deserves to be. If it could be cured of its one bad habit it would become one of the first rank of British ferns. *L. f. mas linearis* is another example of the same fault. This variety comes freely from spores, and "improved" forms have been raised which promised well for a time, but, so far as we know, no one has succeeded in completely breeding out the defect. A number of depauperate crested forms of *filiX-mas* have been found at various times, and their defects have been endured in the absence of a perfect crested form of this sub-species. Now that regular forms have been found (by Mr. Burton) and raised (by Mr. Walton) the roguish and irregular forms will be discarded by growers of "the best only." *L. paleacea apospora cristata* is the nearest approach to a *puleherrima* in its species, but its constitution is so "miffy" that it is almost impossible to grow a really handsome specimen. This weakness is due, pre-

sumably, to a known defect in its germ-plasm, the nucleus of its cells containing only half the normal number of chromosomes. As the fern is apogamous as well as aposporous it is not easy to see how this defect can be corrected, but should it ever produce spores fresh possibilities may arise in view of the notorious tendency of aposporous ferns to produce (by this method) defective offspring. So far as is known no spores have ever been produced: the writer has a plant which has this year developed fronds 16 to 18 inches in length but they show no trace of spores. *Lastrea montana filifera*, Wiper, raised great expectations when first shown, but has proved disappointing on account of its tendency to revert to the normal character. It can be very beautiful at times but needs to be stabilized. *Polypodium v. omnilacerum*, Bennett, is an old form of great beauty when at its best, but it probably never was a constant variety, although sometimes plants have been seen with all the fronds in good character for a time. As a rule a large number of nearly normal fronds will be produced for one characteristic one, and neither cultivation nor selection seems to affect this tendency to "run wild." The Oxford *omnilacerum* is constant and very fine when well cultivated, but if starved or neglected it also tends to approach the normal. It is a great improvement upon the older form, although not quite equal, in sharpness of cutting, to the latter at its best. *P. v. Cornubiense* is a standing joke on account of its tendency to become coarser in cutting and also to produce a proportion of normal fronds. "Improved" forms have been raised from spores by the late Mr. Fowler, Mr. Clapham and others, but these have all ultimately manifested the same tendency as the original. The most successful improvement is the "*trichomanoides*" of Messrs. Backhouse, which is however only the original *Cornubiense*

in its best form, kept true by long continued selection, not of seedlings, but of the best rhizomes. Even this plant produces a few small normal fronds, which are best removed as soon as made. It has, however, practically lost the habit of producing coarser fronds. It is certainly an improvement which may presumably be carried further by persistence in the policy of selection. The improved form (like the original when first grown) has rhizomes of a slenderer and less shaggy character than the species. In the coarser forms the rhizome approximates to that of *P. vulgare*. Another variety with slender and comparatively smooth rhizomes is *P. v. serra*, J. Wilson. The trouble with this variety is its miffy and weak growth. The rhizome has a tendency to grow out of the ground and to erect itself in the air. This aspiring tendency needs to be kept in check either by pinning the rhizomes to the soil or by frequent top-dressings of leaf mould.

Of good but faulty *Polystichums* there are many. Most of the *brachiatus* and *brachiato-cristatus* tend to be irregular in the form of the fronds, sometimes for a time losing either the brachiation or the cresting, and sometimes both. Keall's is the best so far, but even this sometimes has only one arm instead of a pair, and frequently the arms are of unequal lengths or placed at different levels. Many very irregular brachiate forms have been found, but most of them have been discarded. The *grandidens* forms are mostly a ragged lot, having pinnæ of unequal length and often truncate extremities. Gray's was the most regular, having a well-finished tapering extremity, but this fine form is now rarely seen. Fitt's is a pretty form, having a crispate character in addition to its long teeth. The *lineares* nearly all have aborted pinnules in the middle of the frond (*medio-deficiens*). Moly's *hirondelle* is the best, but seems to have

a weak constitution, tending to go blind, and even to die, without any obvious reason.

The *polyductylums* are all lacking in thoroughness, almost invariably having some pinnæ undivided. Mr. Walton seems to be on the track of an improved strain. *Setosocuneatum*, Phillips, is a lovely fern, quite constant in character, and with perfectly symmetrical fronds. In the writer's hands, however, it has an annoying trick of going blind as soon as a nice specimen has been grown. Where it has been seen doing well it generally has had a mass of crowns, and this tendency may be a sequel of the other. *P. ang. flabellipinnulum*, a very curious and distinct fern, often drops the fan shape and lapses into an acutilobe. Some may prefer this to the fan character, but there are many better acutilobes and there is only one *flabellipinnulum*. In order to keep it true it is necessary frequently to raise stock from bulbils of the true form, and then many of them will lapse. *P. inæquale variegatum*, Padley, is prettily spotted with white, and quite constant in its variegation, but is spoilt by its irregular outline. Occasionally, although rarely, a frond is produced of normal outline, and if this could be perpetuated it would be a great improvement; the plant would then cease to be an *inæquale*. Attempts have been made by the writer to raise stock from bases of these normal shaped fronds, but, unfortunately, without success, as it was impossible to get off the fronds quite at their junction with the caudex on account of their being in the middle of a breaking-up crown. Mr. Henwood has now a regular frond bearing a small bulbil, which will be carefully preserved.

P. angulare pulcherrimum variegatum, Moly, has perhaps more virtues and vices than any other form of *angulare*. Along with a splendid *pulcherrimum* character it has an

absolutely unique variegation of the most beautiful kind, and the two combine to place it in a class by itself among British ferns. Its vices are (*i.*) a very miffy constitution, which is probably due to the lack of chlorophyll in its composition, and (*ii.*) a trick of producing abortive pinnæ, especially towards the tip of the frond. This unfortunate habit quite spoils its symmetry as an adult plant. It is much less in evidence in young plants, and, in fact, is rarely seen on plants having fronds under a foot in length. The writer has been trying to breed out this defect for nearly forty years, and has succeeded in some measure, although not entirely. A plant was raised by apospory some twenty-five years ago in which the majority of the fronds are symmetrical and free from depauperation. A touch of the old Adam, however, shows itself in a few fronds, although to a much less extent than in the parent. More recently another plant has been raised (from spores) which, so far, is free from depauperation. It remains to be seen whether the reform will be permanent or not. *Scolopendrium v. crispum fimbriatum*, the most beautiful form of the species, is liable, when slightly out of health, to lose the fimbriate character and to become simply an irregular *crispum*. This means that it has so much to do that it can only do its full duty when in the highest state of health. *S. v. crispum Drummondicæ* is another fimbriate *crispum* which was unreliable in character from the first, and apt to produce normal fronds even under good conditions. Improved forms have been raised by Mr. Bolton and the late Mr. Druery, but I am not sure whether these have remained permanently constant. If unfairly treated they would probably degenerate like the allied variety.

F. W. S.

A GLOSSARY OF FERN NAMES.

(Continued.)

LASTREA PROPINQUA.

- attenuata*—(see under *L. filix-mas*).
concinna—neat.
congesta—crowded.
confluens—(see under *L. filix-mas*).
crispa—(see under *L. paleacea*).
cristata—(see under *L. paleacea*).
dactylifera—finger-bearing.
erosa—(see under *L. filix-mas*).
excurrents—(*lit.* running out) having projecting points.
gracilis—slender.
grandiceps—(see under *L. filix-mas*).
mikra—short, small.
morsa—bitten off, shortened.
producta—(see under *L. filix-mas*).
pulchella—pretty, small and beautiful.

LASTREA MONTANA

- angusta*—narrow.
angustifrons—having narrow fronds.
apuaeformis—shaped like a small fish (*i.e.*, the pinnæ).
attenuata—drawn out ; slender at the tip.
breviloba—having short lobes or pinnules (generally more or less irregular).
caudata—tailed (*i.e.*, terminal pinnules confluent, thus resembling a tail).
concinata—well adjusted ; neatly put together.
congesta—crowded ; thrust together.
coronans—crowning (*i.e.*, with crown-like terminal.)
corymbifera—(see under *Athyrium f.f.*).
crispa—curly.

crispata—curled.

crispatissima—very much curled.

cristata—crested.

cristata-gracilis—crested and slender.

curta—short (pinnæ).

curvata—curved (pinnæ curved downwards).

decurrens—running downwards (pinnules attached by a wing to the midrib).

digitata—fingered.

erosa—as if gnawed or eaten.

filifera—thread-bearing (*i.e.*, with a fringe as of threads).

flexuosa—bending ; full of turns.

furcillata—having little forks at tips.

gracilis—slender.

grandiceps—(*see* under *Athyrium*, &c.).

inequalis—irregular ; unequal (*i.e.*, the pinnules).

incisa—cut in ; gashed.

interrupta—broken off (the continuity of its parts broken).

latifolia—broad-leaved.

multiformis—having many shapes.

multifurcata—having many forks.

plumosa—feathery.

polydactyla—many-fingered.

præmorsa—as if bitten off ; abruptly shortened.

rotundata—having rounded pinnules.

rugosa—wrinkled or furrowed.

serrulata—small saw-toothed.

simplex—simple ; less divided than the normal.

stricta—narrow.

truncata—abruptly shortened (compare *præmorsa*).

POLYPODIUM VULGARE

attenuatum—drawn out ; slender at tips.

auritum—having ears (long basal lobes to pinnæ).

bifidum—pinnæ two-cleft.

bifido-multifidum—pinnæ two-cleft, with many-cleft head).

brachiatum—having arms (long basal pinnæ).

Cambricum—belonging to Wales, where first found (really a *plumosum*).

Cornubiense—belonging to Cornwall (where first found).

crenatum—(see under *Asplenium Ceterach*).

cristatum—crested.

curtum—short (pinnæ).

densilobum—having dense lobes.

dentatum—toothed (in botanical language *dentate* is the reverse of *crenate*, i.e., sharp teeth with rounded concavities between).

falcatum—with pinnæ shaped like a reaping hook or sickle.

foliosum—leafy.

foliosissimum—very leafy.

elegantissimum—very elegant. (The descriptive name given to *var. Cornubiense*).

glomeratum—gathered into a ball or knot).

grandiceps—(see under *Athyrium*).

Hibernicum—belonging to Ireland, where first found (for description see *semilacerum*).

longipinnatum—having long pinnæ.

macrosporum—having large sori (a form of *semilacerum*).

macrostachyon—long-spiked.

marginatum—margined; having a marginal ridge beneath.

multifidum—many-cleft; split into many parts.

multiforme—having many shapes.

omnilacerum—completely torn (i.e., *bipinnate* throughout).

pluma—a soft feather.

plumosum—feathery.

pulcherrimum—very beautiful.

pulchritudine—with beauty.

ramosum—branched.

rotundatum—rounded (pinnæ).

semilacerum—half-torn (*i.e.*, with the inner parts of the pinnæ *bipinnate*).

serra—a saw.

serratum—saw-toothed ; cut like a saw.

sinuatum—winding (the margin).

suprasoriferum—having sori on upper surface.

trichomanoides—Trichomanes-like. (An unfortunate name seeing that the species of *Trichomanes* differ so much from each other. No doubt *Trichomanes radicans* was meant.)

truncatum—mutilated or cut off short.

undulatum—having little waves like the surface of the sea.

BRITISH PTERIDOLOGICAL SOCIETY.

BALANCE SHEET, 1920.

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The number of members is 146, including 10 new subscribers, who have joined in the past year. The Society has lost two members by death, and two have resigned. There are, in addition, three Honorary Members.

VOL. 4.



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... The ...

British Fern Gazette.

PUBLISHED QUARTERLY.

December, 1920.

EDITED BY

F. W. STANSFIELD, M.D.

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*(President and Hon. Treasurer, Mr. W. B. Cranfield, East Lodge,
Enfield Chase, Middlesex.)*

*(Hon. Sec. Mr. Charles Henwood, 21, Clifton Road, Maida Vale,
London, W. 9.)*

KENDAL, WESTMORLAND.

THE BRITISH FERN GAZETTE.

NEW SERIES

VOL. 4.

DECEMBER, 1920.

No. 7.

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EDITORIAL NOTES.

We are glad to report that our hint, in our last issue of notes, has been acted upon for, not only have members generally (so we are informed) "paid up" well but there has been a decided influx of contributions to the Gazette. We regret to learn that some members have resigned but hope that some of these will reconsider the matter and rejoin the Society later. In the meantime we must close up the ranks and beat up for new recruits. We note that the British Mycological Society, which works upon somewhat similar lines to our own, has increased its subscription from ten shillings to one pound per annum, and it is reported that some ardent spirits were anxious to go beyond this really very moderate sum.

We have received a copy of a recent issue (October 8th) of that handsome publication "Irish Life," in which is given an interesting account of the fernery of our contributor

and Vice-President, the Revd. Canon Kingsmill Moore, with pictures of parts of his garden and a somewhat distant glimpse of the Reverend Doctor himself.

We are indebted to Mr. J. E. Austin, of West Court, Detling, Kent, for a fine plant of a beautiful and distinct new form of *P. angulare divisilobum* which his neighbour, Mr. Bensted, received as a wild find from a friend in Ireland some years ago. Unfortunately, the sender has since died, and the history of the fern is somewhat obscure. We are, however, casting about for further information, and hope soon to be able to trace its exact origin. It is certainly a very fine thing, one of the best pure *divisilobes* we have seen, if not the very best. It has very long lower pinnules and is very finely dissected, being quadripinnate, even in the half-mature state, and may even be quinquepinnate when well developed. The ultimate segments are very narrow and slender. It is fertile, a good grower, and produces bulbils freely, so that it will doubtless soon find its way into general cultivation. It is in every way superior to *divisilobum proliferum*, Bagg, (Henleyæ) which Col. Jones thought "could hardly be surpassed."

We have also received from Revd. Canon Kingsmill Moore a frond of another handsome *divisilobum*, recently found in Queen's County. It is comparable in development to *div. proliferum*, Bagg, but has somewhat shorter lower pinnules, which are, however, very much curved outwards, giving the frond a suggestion of *pulcherrimum* in appearance.

Mr. P. Greenfield, of Warlingham, sends a frond of a *breviloba* form of *L. montana*, which he found this year near Buttermere, but did not collect. Judging from the frond sent it is more regular and even in make than any *breviloba* we have previously seen. We learn that Mr. W. Wilson, of Kendal, has recently found a new crested

Polypody, of which we hope to see a frond in due time.

On page 31, Vol. II., of the Gazette, Mr. Druery recorded a case of a solitary frond of *Cambricum* type arising from a plant of *Polypodium v. semilacerum* and supposed it to be a bud sport of plumose from semilacerum or sub-plumose character. Mr. T. E. Henwood has now a plant which was originally *P. v. plumosum*, Hadwin, but which last year (1919) began to send up fronds of *semilacerum* character. The *semilacerum* portion of the rhizome was visibly continuous with the *plumosum* portion, so there was no question of an intrusion from spores or otherwise. This year the *semilacerum* has, as might be expected, got the upper hand, and has almost choked out the *plumosum*, although two or three fronds of true *Hadwinii* are still visible. It will be an interesting experiment to sow spores of the *semilacerum* in order to see whether *Hadwinii* can be raised from it.

The Hon. Secretary will be much obliged if members who have not yet paid their subscriptions or arrears will send a remittance at once to Mr. C. Henwood, 21, Clifton Road, Maida Vale, London, W. 9.

AN OLD FERN BOOK.

On a recent visit to a second-hand book shop I came across a "History of British Ferns" (4th Edition, dated 1844), by Edward Newman. Not very old, as books go, but if the Author's introduction has been read aright, one is led to believe that this was the first book worth reading that had been written on the subject of ferns. The style, of course, has not the quaintness of Culpepper or Samuel Pepys, but it has an Early Victorian flavour which I found quite entertaining.

Fern culture must have been in an early stage when the book was written, for Mr. Newman states that "Since the publication of my First Edition, the cultivation of Ferns has become fashionable: it is no longer confined to the professional nurseryman or florist, as was then the case, but almost everyone possessing good taste has attempted more or less successfully to cultivate these exquisite plants."

Mr. Newman, author also of books on Bird Nesting, British Birds and Entomology, had apparently acquired confidence in himself through prolific writing, and does not adopt the apologetic tone so noticeable in the prefaces of some of our modern authors. Notice how he speaks of "The Fern Books that have sprung up around mine, like mushrooms around the parent plant. I have read them all; I have thought this a duty and have performed it; and I unhesitatingly pronounce, with the German critic, that in all the mass of Fern literature that owes its existence to my various editions, 'What is new is not true, and what is true is not new.' " He ends by magnanimously wishing success to the host of imitators which his final edition would doubtless raise up, and expresses his satisfaction that "Newman's Ferns" had become a household book.

Like many a later student of the subject, Newman seems to have been considerably muddled by the scientific nomenclature of ferns. Generic names especially seem to have annoyed him. He says, "As regards generic names such as *Aspidium*, *Nephrodium*, &c., it will soon be seen by any one who studies botanical works that these names have no definite signification," and he follows on by saying that he never met a botanist really conversant with ferns who used them, the specific name being invariably

used by itself. Thus he would talk of "*recurvum*, *trichomanes*, *viride*, &c." He also adopts his own classification of the British ferns ("for which I claim no merit," he adds). He starts with *capillus-Veneris*, continues with *leptophylla* and *spicant*, through *aquilina* and *crispus* to the Polypodies and Woodsias, then passes to the Bladder Ferns, Prickly Ferns and Buckler Ferns (under all sorts of names) to the Lady Fern and Spleenworts, ending with the filmies, Royal Fern, Moonwort and Adder's Tongue. It is interesting to note that he claims to have communicated the discovery of *Gymnogramma leptophylla* to the botanical public of England, after verifying its name.

Variations receive no mention, and even *Polypodium vulgare* var. *Cambricum*, which the most orthodox of modern botanists includes in his list, is passed by unnoticed, though I believe it had been discovered by Ray long before this book was written. However, he gives away the habitats of the rarest of our ferns, a practice which cannot be safely indulged in during these days of vandalism.

But, among many interesting things in this book, what chiefly caught my attention was the description of certain species, of which I admit I have never heard. One of these is called Wilson's Fern, or *Polypodium Myrrhidifolium*, of Villars, previously, but incorrectly, named *P. montanum* by Link. This little fern, it appears, was found on Ben Lawers by Mr. Wilson, of Warrington, in 1836, and in neighbouring localities by others at a later date. Mr. Newman "had the pleasure of introducing it to the British Flora in 1844." It had a creeping root stock, with a slender erect stalk, topped by triangular, pinnate fronds which lie horizontally. Said to occur freely on the Continent, it was only to be found in this country in the Ben Lawers district. [The reference is to *Cystopteris montana*.—ED.]

Another puzzler is Bennett's Fern, or *Lophodium glandulosum*, no botanical authority being given for the name. [Newman himself was the culprit.—ED.] It appears to have been a very large plant, which I gather from the description to have resembled *Lastrea dilatata*. The author states that the Forest of Dean and Epping Forest were the only reliable localities for this fern. [See *Lastrea dilatata* and its Allies, page 107, Vol. III., BRITISH FERN GAZETTE.—ED.]

A third species which I do not recognise is *Pseudathyrium flexile*. Newman states that "Flexile has been referred by speculative botanists to *Filix-femina*, *alpestre* and *fragilis*, but those who are practically acquainted with it, without exception, consider it a distinct species." It was found abundantly in one locality in Glen Prosen, in Forfarshire, by a party of botanists, and our writer thinks it will doubtless be found generally distributed over the Highland Glens of Scotland. [See Species and Varieties, BRITISH FERN GAZETTE, Vol. III., page 178.—ED.]

Mention of two other species must suffice. One is called Bory's Spleenwort, the *Asplenium acutum* of Willdenow, and the *Asplenium productum* of Lowe. This "exquisitely beautiful fern" seems to be one of the most divided of British ferns, abundant in the Azores and other places, unknown in Great Britain, but occurring in three Irish Counties, Down, Kerry and Cork. It grows in company with the Black Spleenwort but is perfectly distinct from it. [*Asp. Ad. nigrum acutum*, the "French fern" of the flower markets.—ED.]

The other species is Petrarch's fern, *Asplenium Petrarchæ* (Bory). From the illustration given, I gather this resembles *Asplenium viride* in general outline, the fronds being about three inches long, less than half an inch wide and diminish-

ing to a very sharp tip. A Grecian species which it seems was discovered by a Lady Clermont, near Flurry Bridge, in Ireland. Newman states that it is precisely intermediate in habit and form between *Ruta-muraria* and *Trichomanes*. [*Asplenium Petrarchæ* D.C. was reported to have been found in Ireland as above, but the plant does not appear to have been identified by any responsible authority. The author of *Cybele Hibernica* believes that a form of *A. trichomanes* was mistaken for it. Mr. Henwood has now a plant of *A. trichom. subæquale* (Moore) found by Mr. Relton in the Wye Valley, which, in its present condition, might well pass for *Petrarchæ* as figured in "Britten's European Ferns." Newman himself omits all mention of this fern in his edition of 1854.—ED.]

The object of these lines has been to ask what has become of these ferns. The fern books available to me do not mention them. Have they been heard of since, or have they become extinct? Are the names used by Newman synonymous with others more familiar to the present generation, or did he mistake varietal forms of common ferns for new species? These questions are a confession of ignorance, but perhaps some one could lighten my darkness and say something more about them. It seems a pity that several interesting and apparently beautiful species should pass out of our Flora without even a gravestone marked "Extinct." Can anyone rescue them from oblivion?

Cardiff, South Wales.

S. P. ROWLANDS.

DEAR SIR,

I notice in your last number of the FERN GAZETTE, you ask for contributions from others than those who usually supply them, and so make no apology for making a small

contribution, although it is chiefly in the direction of asking for information and guidance.

Due no doubt to want of experience, I have occasionally met with difficulty in satisfactorily raising ferns from spores in the initial stage. This difficulty takes the form of a very fine white fungus, which, starting in a spot, gradually spreads over all the prothalli. In cases where the white fungus has started, I have at once pricked off small portions of prothallus into other pots or boxes with good results, as these have gone straight ahead, and show practically no further signs of fungus.

I always sterilize the pot and soil by pouring boiling water on the surface of the soil until the bottom of the pot is too hot to hold, and then immediately place a square of glass over the pot and allow to cool. The glass is only removed (once) to sow the spores, when the pot is stood in a saucer of water, the whole being placed in a cold frame which only gets what sunshine filters through the branches of a tree. When the sun has been very bright I have generally spread a light covering over the frame.

Is an explanation of this fungus growth to be found in sowing the spores too thickly, as I have made this mistake sometimes, or are some varieties more liable to it than others? I have tried removing the glass cover from over the pot but without any appreciable effect in arresting the growth of the fungus.

I should be interested to know whether any other grower has had a similar experience. So much for difficulties.

My experience this year in sowing has been very different from what I have previously had and from what I have always understood to be usual. On June 30th, I made a sowing of eight different varieties and within a fortnight the surface of the soil in six out of the eight was covered

with young prot'alli, whereas in former sowings I have always had to wait about eight weeks, under similar conditions in a cold frame. Can this be explained by the fact that this year I sowed the spores as soon as ripe whereas formerly I used spores obtained from a fern specialist who may have had them in stock some time? Do fern spores partially lose their vitality with age? I have been told that spores of the varieties of *Osmunda* have chlorophyll in their composition and do not remain active for more than two or three days. Whether this is so or not I cannot say, but took the precaution of gathering a fertile frond when green. The spores very soon fell out on a sheet of paper and I noticed that they were decidedly green, not brown like others. I lost no time in making a sowing and have been rewarded by a pot full of very promising looking prothalli.

Yours sincerely,

FRANK BURTON.

Roughetts, Hildenborough, Kent, 13/10/20.

[Our correspondent's experience in sowing spores is by no means singular. There is a great tendency to sow too thickly, and this conduces to the growth of moulds (i.) by lowering the vitality of the prothalli from overcrowding and (ii.) by giving increased facility for the spread of fungous growth should germs be introduced, which is almost inevitable. Mr. Burton's plan of immediately pricking off the uninfected prothalli into another pot (giving them more room) was quite right and is the only safe plan, although a *spot* of fungus can frequently be killed out by watering with a weak solution (pink) of potassium permanganate. It is true also that some varieties are more liable than others to fungous growth. The more vigorous the

variety or species, and the more quickly it develops, the less likely is it to be damaged by moulds or other intruders. Consequently a sowing which can be brought on rapidly, with the aid of a little artificial heat, runs less risk of infection than one which lingers for months or years in a cold frame before the prothallic stage is passed. Also spores sown as soon as ripe develop more vigorously, and are more resistant to infection than those which have been kept for some months. Mr. Burton is also right about the short-lived character of the spores of *Osmunda*, which is also shared by those of the *Todeas* and probably of other filmy ferns.—EDITOR].

FERN CHAT.

It is now some thirty years since the question of multiple paternity in ferns was first mooted by the late Mr. Lowe and it may still be considered (as the Scotch say) "not proven." [Far from it.—ED.] There is, however, such an accumulation of evidence in favour of the free and easy crossing of varieties as to leave no room for doubt on that subject. Such an admission has very far-reaching consequences. In view of what has already been achieved in the way of crossing, we must be prepared to admit that any two varieties of a species will cross and can be combined, provided they are sown together, and the prothalli mature at about the same time.

The variety *muricatum* has been combined with almost every variety of *Scolopendrium*, the same with *marginatum*, *periferens*, *grandiceps* and many others. Among *A.f.f.* we find every variety now has its crested, congested, cruciate

or ramose counterpart. Even such dissimilar types as *kalothrix* and the heavily crested *gemmatum* and *formoso-cristatum* have joined in holy wedlock.

The question now arising is—what constitutes a species? There is no certainty that the present arrangement of ferns into genera and species is the correct one. For instance, if varieties only and not species can be crossed, we are driven to the conclusion that some of our so-called species are simply varieties. *P. angulare* crosses with *P. acrostichoides*, *Polypodium aureum* with *P. vulgare*. *P. aculeatum* intermarries freely with *P. angulare*.

If we admit the general crossing of species, even if the operation is effected only on rare occasions and with great difficulty, what a vista of latent possibilities is opened up before us! Imagine a cross between *L. atrata* and *L. montana* or *L. thelypteris*. It needs no very great stretch of the imagination to see in the *Dicksonias* and *Cyatheas* of the Southern Hemisphere, the combined characters of hitherto unsuspected parents. [?—ED.]

In a sowing of crested *Ceterach* the writer once noticed what appeared to be at first sight a very promising and apparently pinnate *Scolopendrium*, suggestive of a very superior type of *sagittato-projectum*. This occasioned little surprise, as stray *Scolopendriums* appear in every sowing unless special precautions are taken to sterilize the spore brush after each sowing. The seedling's motto was evidently *festina lente*, the growth being very slow and deliberate, the plant being quite outstripped by its fellows, and only being saved from annihilation by the careful removal of its immediate competitors. In a month or two the fern was definitely identified as *Asp. ad. nig. microdon*, of which no plant existed at that time on the writer's premises. Probably there were only some half-dozen specimens of this

fern in the British Isles, and certainly none within a radius of one hundred miles. The matter is further complicated by the appearance the same year of three seedlings of the same plant in an equally mysterious manner in the fernery of our late President, Mr. Alex. Cowan, at Penicuik. Whence came these plants ? The spores found on *A. Ad nig. microdon* are apparently all abortive, and there is no recorded instance of plants being reproduced by direct sowing.

The most workable hypothesis is, that two distinct species have crossed, of which *S. vulgare* is probably (although not certainly) one. What nature has accomplished in the past (given similar conditions) can and will be effected in the future.

It is highly significant that these seedlings appeared simultaneously, and at places 200 miles apart, and were in each instance the progeny of unknown parents. It may be that exceptionally fortuitous climatic conditions are requisite, and that these conditions very rarely coincide. The fact that the fern in question appeared among a sowing of *Ceterach* only constitutes *prima facie* evidence against that plant, there being no resemblance between the two except similarity in the arrangement of the *sori*. The parentage therefore of this fern presents a very interesting problem for future solution. Correvon mentions, on page 122 of "Fougères Rustiques," the existence of "*Scol. v. hybridum* (Milde), which curious thing appears to be a hybrid between *S. vulgare* and *Ceterach*." That the plant is still in existence is extremely doubtful, at any rate it has never come under the present writer's notice.

H. STANSFIELD.

[We have long considered *Scolopendrium* much more likely than *Asplenium marinum* as a parent in the cases of the three supposed hybrids *A. Ad. nigrum microdon*,

A. lanceolatum microdon and *A. trichomanes confluens*. The only way to settle the question is by direct experiment. We suggest that several members should sow together freshly ripened spores, well mixed, of, say, *Scol. vulgare* with *A. lanceolatum*, *A. trichomanes* and *A. Ad. nigrum* respectively, and report results. *A. marinum* may also be used as an alternative stallion. We have, so far, failed to raise seedlings directly from any of the three so-called hybrids. It is possible that the method of synthesis may be more successful than the attempts at analysis.—Ed.]

PLUMOSE VARIETIES OF FERNS.

The plumose varieties—using the word plumose in its widest sense and including all the “feathery-looking” forms—comprise probably the noblest and loveliest of all ferns inasmuch as the plumose character is simply the extreme development of what constitutes the peculiar beauty of all ferns, viz., symmetry and grace of form combined with freshness and purity of colour. These forms are admired even by those who look upon all variations as “monstrous,” and who regard a *grandiceps* or a *ramosissimum* as a mere deformity if not as an utter abomination. The plumose varieties may be divided into (i.) those originally found wild and presumably primary sports from the species, and (ii.) those raised under cultivation from wild ferns or their descendants, these being therefore at least two generations removed from the species; and it is obvious that it is unfair to make comparisons between members of the two groups. The wild *plumosums* are so by comparison with the parent species and naturally those derived from

the simpler species such as *Scolopendrium vulgare*, *Polypodium vulgare* and *Blechnum spicant* are much less "plumose" (i.e., have less resemblance to plumes) than are those derived from species which are normally more decomposed, of which the Lady Fern may be taken as a conspicuous example. The essence of a plumose variety consists in an increased development of the leafy tissue of the plant as compared with the skeleton. This increase is frequently, if not generally, at the expense of the spore-bearing energy of the plant. The varieties of this type were by no means all originally, or even eventually, named *plumosum* or *plumosa*. The first variety to receive this name, so far as the writer is aware, was *P. angulare plumosum*, found by Elworthy in 1856 and so named by Moore. Next in order of time was probably Wollaston's *P. ang. plumosum*, which was shortly followed by *Athyrium* f.f. *plumosum* found by James Horsfall in Yorkshire, and by the Axminster *plumosum* found in the South-West. Forms analogous to these in other species had, however, been found much earlier—for instance, *Polypodium* "Cambricum," *Asplenium trichomanes incisum* and *Scolopendrium* v. *crispum*, but the name *plumosum* had not been given to them. *Asplenium marinum plumosum* is closely comparable in character to *Polypodium Cambricum*, and received the name *plumosum* because it was found at a time when attempts were being made to name varieties on a distinct plan. A plumose form of *L. Filix-mas* was found in 1857 and named *Bollandiae* by Moore after the finder. Wollaston subsequently dubbed it "*plumosa*," but the name has never displaced the original one although it is a much more philosophic one. The fact is, the names of the earlier varieties were given on no particular principle, but more or less haphazard according to the fancy of the

sponsor. Wollaston tried to introduce a scientific system of nomenclature for varieties but was too late to gather all the varieties into his scheme, most of the older varieties continuing to be known by their original names. Nevertheless, his system of descriptive or characteristic names is the one which has been adopted by subsequent writers with regard to new varieties and will probably prevail more and more as time goes on. At least four plumose forms of *L. montana* have been found, although this was regarded for some time as the least sportive of its genus. All these are grand ferns and, although less feathery-looking than the plumose Lady Ferns, it is found that they bear the same relation to the parent species as do other plumose wild forms, *i.e.*, there is thinning and expansion of the leafy tissue accompanied by subdivision of the ultimate segments and a great decrease in the production of spores. The sori, when present, are moreover devoid of indusia, as in the Horsfall *plumosum* in *Athyrium*. It is odd when we consider the extreme abundance and wide distribution of *L. dilatata*, that no plumose form of that species has been discovered. Let us hope that such a discovery may yet reward some of our members in their hunting expeditions! The *foliosums* differ from the *plumosums* in having fronds of normal substance and texture (*i.e.*, not thinned although expanded) and in having normal fructification. They are really sub-plumose forms.

To come now to the plumose forms of garden origin; it is obviously unfair to bring them into comparison with those found wild. Many, if not most, of the plumose-divisilobes in *P. angulare* have a much greater resemblance to actual plumes than have their relatives the *plumosums*. The principle of subdivision of parts is carried to a greater

degree and also another character comes in, viz., the peculiar sharp cutting and contracted lobes of the acutilobe and divisilobe sections. It is curious that these lovely ferns, combining the beauties of two separate sections of wild varieties, were not raised from either of those sections but from the simpler *decompositum* type which may, therefore, be considered to contain the germs of both the more advanced sections. It is not unlikely that plumose divisilobes *might* be raised by directly crossing the wild *plumosums* with the wild divisilobes, and I know that Col. Jones had at one time the idea of raising a plumose divisilobe in *aculeatum* by crossing Wollaston's *P. ang. plumosum* with *P. aculeatum acutilobum*. His death prevented this idea from being carried out by him, but it is still open to others to essay the same task. The result, however, can hardly be expected to surpass, or even to equal, the lovely *P. aculeatum pulcherrimum plumosum* of Green. It would be a triumph to approach it, and it is an experiment which may be tried by anyone who has the knack of raising ferns from spores, inasmuch as both the suggested parents are easily available and both produce plenty of spores. Perhaps some enterprising member will try it.

F.W.S.

At an Exhibition Meeting of the School Nature Study Union, at the L.C.C. Day Training College, Southampton Row, W.C., on the afternoon of Saturday, September 25th last, I gave a Demonstration Exhibit of the varietal capacity of some of our British Ferns.

By the kindness of Mr. Cranfield, who sent me a box of magnificent fronds, I was enabled to occupy two tables

with a much finer display than I could have attempted from my own relatively meagre resources alone.

The meeting was attended by crowds of visitors during the afternoon, and I found so much interest taken in the fronds shewn, that I became extremely hoarse at the conclusion of the exhibition. It was decidedly no sinecure to explain various phases of interest, over and over again, to a long succession of groups of observers. For the first time I realized, slightly, what speaking a part must mean to an actor.

As usual the *plumosum* and *divisilobe angulares* attracted much notice, although closely run by some very fine *crispum Scolos*. A frond of *P. aculeatum pulcherrimum*, side by side with *gracillimum* (Cranfield) was also much admired. The range of variations shewn in *Polypodium vulgare* evoked much comment.

Altogether, I felt very satisfied that the results in public interest were easily commensurate with the trouble taken.

FRAS. W. THORRINGTON.

In an edition, published in 1896, of "Ferns, British and Foreign," by John Smith, A.L.S., ex-Curator of the Royal Botanic Gardens, Kew (the first edition, by the way, was published in 1866), there is a note on page 289, of what I imagine to be *A. f.f. plumosum* (Horsfall). This comment is so very apropos of the raging battle as to "specific" value in classification that I feel impelled to give it in its entirety, especially as I can remember no reference to it in the past pages of the GAZETTE.

The Author, it will be observed, gives it as represented in Lowe's "New and Rare Ferns" t. 14—and also says—Yorkshire (Mr. Stansfield): The plate given by Mr. Lowe does not convey to me an impression of identity with

Nature Print IX. in Druery's "British Ferns, &c." but as it is stated as having been found at Skipworth, I judge that *p. Horsfall* must be meant.

This, being a Stansfield family matter, is an instance where a comment by our Editor should be of especial value.

FRAS. W. THORRINGTON.

Extract from "Ferns, British and Foreign" page 289.

84. PHEGOPTERIS

2. *P. plumosa*, J. Sm.—*Asplenium Filix-foemina*, var. *plumosum* (Moore) "Nat. Print Ferns," Oct. ed. p. 56, Lowe's "New Ferns," t. 14—Yorkshire (Mr. Stansfield).

Obs.—A few years ago three plants of this fern were found wild in Yorkshire. It was soon afterwards described and figured in the works above quoted, under the name of *Asplenium Filix-foemina*, var. *plumosum*; but upon what grounds it was referred to *Asplenia* I cannot explain, as all the specimens I have examined of it have small, punctiform, naked sori, perfectly characteristic of the genus *Phegopteris*, with which it also agrees in habit. This leaves me no other alternative than to consider it a species of that genus, and consequently a new British species. In doing so, the question arises as to whether it represents an ancient species not before noticed, or the modern result arising from the power of nature to generate new forms, in accordance with the Darwinian Theory of creation of species. It is, however, to be observed that in abnormal or difformed states of *Asplenium* and *Scolopendrium*, the sori are depauperated, in some instances having no vestige of an indusium; but such is not the case with this plant. The fronds are perfect in every respect, and if Herbarium specimens had been received from some foreign country, no Pteridologist, on seeing the naked sori, would refer it to *Asplenia*.

[The fern referred to is *A. f.f. plumosum*, Horsfall, which was found by a gardener (James Horsfall), in the employ of the present Editor's father and grandfather. Mr. Smith was not alone in the idea that it was a new species, but he was probably the only man to publish that opinion. At that time botanists were rather scornful about the phenomenon of variation in ferns, and most of them had the belief that the characters of fructification, upon which their genera and species were mainly based, were fixed and immutable. This notion has long been known to be a mistaken one (see "Fern Mysteries," BRITISH FERN GAZETTE, Vol. III., pp. 125—130). It was demonstrated as a fallacy by the first considerable batch of seedlings raised from the Horsfall *plumosum*, inasmuch as these showed, not only plants closely resembling the parent, both in the nakedness of the sori and in the plumose form of the frond, but also plants intermediate between *plumosum* and the normal species, some being more or less feathery but with normal sori, while others bore imperfectly developed indusia attached to the sori.—EDITOR.]

A GLOSSARY OF FERN NAMES—(continued.)

POLYSTICHUM ACULEATUM.

acrocladon—(see under *Athyrium f.f.*).

acutilobum—having acute lobes.

argutum—sharp, clear, well defined.

capitatum—having a head (see under *A.f.f.*).

corymbiferum—bearing a terminal cluster.

cristato-gracile—crested and slender (see under *A.f.f.*).

- cristatum*—crested (see under *Blechnum*).
gracile—slender (see under *A.f.f.*)
gracillimum—very slender.
grandiceps—(see under *A.f.f.*, &c.).
lobatum—having lobes or divisions.
micaceum—belonging to a soil containing mica.
multifidum—(see under *A.f.f.*, &c.).
proliferum—bearing offspring (*i.e.* *bulbils*).
pulcherrimum—most beautiful (see under *A.f.f.*).
pulchrum—beautiful (see under *A.f.f.*).
stipatum—crowded, compressed (see under *A.f.f.*).

POLYSTICHUM ANGULARE.

- acrocladon*—(see under *A.f.f.*).
acutilobum—having acute lobes.
acutissimum—very sharp.
adpressum—pinnæ pressed towards rachis.
alatum—winged (pinnæ congested so as to resemble wings).
alato-revolvens—winged and rolled backwards.
apucæforme—(see under *Athyrium f.f.*).
angustifrons—narrow fronded.
angustum—narrow (see under *L. montana*).
abasipinnulum—lacking the basal pinnules.
arctissimum—very thick, close (really a dense acutilobe).
attenuatum—drawn out, slender at tip (see under *Polypodium v.*)
aureum—golden.
brachiatum—having arms (*i.e.* basal pinnæ greatly prolonged, see under *A.f.f.*).
brachiale (Lowe)—a variant of above ; really a *brachiatum*.
capitatum—having a head or large crest (see previous list).
caudatum—tailed (apex of frond narrowed and prolonged like a tail, see under *A.f.f.*).
conchatum—having (cockle) shell-like pinnules.

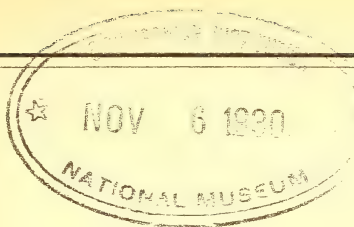
- concinnum*—neat (really a foliose *perserratum*, see under *Blechnum*).
- confluens*—pinnules flowing together (see under *Blechnum*).
- confertum* } crowded, thrust together (see under *A.f.f.*).
congestum }
- conspicuilobum*—pinnules having a projecting lobe.
- coronare* } having a crown-like crest (see under *A.f.f.*).
coronatum }
- corymbiferum*—(see under *A.f.f.*).
- cristatum*—(see under *A.f.f.*).
- crispatum*—curled (see under *A.f.f.*).
- cruciatum*—(see under *Athyrium*).
- cruciato-pinnulum* } having twin pinnules taking opposite
crucipinnulum } directions, *i.e.*, cruciate (see under *A.f.f.*).
- cuneatum*—having wedge-shaped pinnules.
- curtum*—short (fronds), (see under *Blechnum*).
- decompositum*—(see under *Lastrea F. mas.*).
- decorum*—handsome, comely, seemly.
- decurrens*—(lit. running down) pinnules attached by a wing to subrachis (see Druery's last book, p. 197).
- deltodeum*—triangular, like the Greek letter Delta.
- deorso-pinnatum*—pinnæ extended downwards, *i.e.*, having long lower pinnules.
- depauperatum*—impoverished, lacking in parts (see under *A.f.f.*).
- dissectum*—pinnules cut into small segments, as it were “dissected.”
- divisilobum*—lit. having divided lobes (see article in GAZETTE, No. 5, Vol. IV., The Sections of *P. angulare*).
- divisum*—divided (really a form of *decompositum*).
- dumetum* } like a thicket (heavily crested forms).
dumosum }
- falcatum*—sickle shaped (pinnæ and pinnules).

- falcato-pinnulum*—having sickle shaped pinnules.
flabellipinnulum—having fan-shaped pinnules.
flexuosum—full of bends and turns.
foliosum } leafy (see under *A.f.f.*).
frondosum }
furcans—forking (see under *Blechnum*).
furcillatum—having little forks (see under *A.f.f.*).
gracile—slender (see under *A.f.f.*).
grande—large, fine.
grandiceps—(see under *A.f.f.*).
grandidens—(see under *A.f.f.*).
hirondelle (French)—a little swallow (in allusion to form
of two opposite pinnules) (see GAZETTE Vol. III, p. 250).
imbricatum—tiled (pinnæ and pinnules overlapping)
(see under *Asplenium marinum*).
incisum—cut in, slashed (see under *Lastrea montana*).
inæquale—unequal, irregular (see under *A.f.f.*).
interruptum—having parts missing.
laciniare—finely pleated.
latifolium—broad-leaved (large pinnæ) (see under *A.f.f.*).
latipes—broad at the base.
lineare—pertaining to or resembling lines (see under
Asplenium marinum).
lineatum—having lines (really a *supralineatum*).
longipinnatum—having long pinnæ (see under *Poly-*
podium v.).
manica-infantis—a child's glove.
marmoratum—marked or coloured like marble.
micron—small, short.
mousogenes—artistic (child of the Muses).
multifidum—(see under *Athyrium*).
multilobum—(lit. having many lobes) (see GAZETTE.
No. 5, Vol. IV.).

- nitescens*—(lit. beginning to shine) a promising variety.
nudicaule—naked-stemmed (see under *A.f.f.*).
obtusissimum—very blunt (pinnæ and pinnules).
orbiculatum—globular (*i.e.*, the head or crest) (see under *A.f.f.*).
ovale—oval or egg-shaped (fronds).
oxyphyllum—acute-leaved (*cf.* *acutilobum*).
parvissimum—very small.
pendens—drooping.
percristatum—crested all through (pinnules crested) (see under *A.f.f.*).
perserratum—deeply saw-toothed.
pedicellatum } pinnules stalked.
pediculatum }
plenum—full, dense.
plumatile—as though embroidered with feathers.
plumosissimum—very feathery or feather-like.
plumosum—feathery or featherlike (see under *Asplenium marinum*).
polyclados—many-branched.
polydactylum—many-fingered (see under *A.f.f.*).
præmorsum—with the end or tip as if bitten off.
productum—pinnules pointing forward (lit. led forward).
projectum—jutting out (irregular branches) (see under *Blechnum*).
proliferum—bearing offspring (bulbils).
pterophorum—wing-bearing (pinnules crowded, but not pinnæ) (see *alaïum*).
pulcherrimum—very beautiful (see under *A.f.f.*).
pumilum—dwarf (see under *Lastrea F. mas*).
quadripinnatum—frond four times divided (*i.e.*, pinnules twice divided).
ramosum—branched (see under *A. Ad. nigrum*).

- ramulosum*—having small branches (*i.e.*, branched at head, but not from base).
- ramoso-pinnatum*—having branched pinnæ.
- retroflexum*—pinnæ bent backwards.
- revolvens*—rolling backwards (see under *A.f.f.*).
- rotundatum*—pinnules rounded (see under *Blechnum*).
- scalptum*—carved or engraved (*i.e.*, surface).
- setosum*—bristly, hairy, fringed with hairs.
- sinuosum*—with sinuous stem.
- stipatum*—crowded, compressed (see under *A.f.f.*).
- stipitatum*—having stalked pinnules.
- stipulatum*—made of straws or little stalks (hence thatched or resembling thatch).
- tenue*—slender, thin (see under *A.f.f.*).
- tripinnatum*—frond thrice divided (*i.e.*, pinnules once divided) (see under *Blechnum*).
- truncatum*—abruptly shortened (see under *A.f.f.*, *cf. præmorsum*).
- turgidum*—swollen.
- venustum*—lovely, charming.
- vestitum*—clothed (scaly).

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THE BRITISH FERN GAZETTE.

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EDITORIAL NOTES.

We are indebted to our member Mr. T. Brown, J.P., of Belfast, for help in unravelling the history of the very fine *P. angulare divisilobum* referred to in our December notes as having been sent by Mr. J. E. Austin, of Detling, and received by him from his neighbour, Mr. Bensted. The fern was sent to the latter about eight years ago by the late Mr. J. H. Bland, of Tobarcooran, Carnmoney, and it appears from Mr. Brown's researches that Mr. Bland himself found it on Carnmoney Hill, Co. Antrim, a few miles from Belfast. This fact rests upon the testimony of Mr. Francis J. Bigger, of Belfast, who had many conversations with Mr. Bland about it. The exact date cannot be ascertained, but it was probably some 10 or 12 years ago. The fern will therefore be known as *P. angulare divisilobum*, Bland.

Mr. Everard Hamilton, of Dundrum, has kindly sent, through Canon Kingsmill Moore, a plant of the Queen's County *angulare*, of which the latter gentleman recently supplied a dried frond. On examination of the fresh plant it appears to be an acutilobe rather than a divisilobe, *i.e.*, the upper and lower pinnules are of approximately equal length. It is a very neat fern and has a general resemblance to *acutilobum*, Hartley, but is not bulbiferous like that variety: also the pinnules are a little more falcate than in Mrs. Hartley's plant. It was found by Mr. Hamilton some 20 years ago at Clopook (*i.e.*, "Rock of the Fairies"), Queen's County. The finder wishes the locality to be perpetuated in the name which will therefore be *acutilobum Clopookense*, Hamilton.

The two choice plants here recorded draw fresh attention to Ireland as a happy hunting ground for fern-lovers. We trust that Irish political affairs may soon be sufficiently settled to permit peaceful botanists from the sister isle to pursue their avocations in that beautiful but, at present, unhappy country.

Mr. W. H. Stansfield, of Southport, reports that he has found *Asplenium Germanicum* in a new locality in Westmorland. We trust it may be permitted to remain there. The last thing a true botanist desires is to exterminate a rare species.

Our present issue contains a corrected list of members and their addresses. We regret to note the disappearance of several familiar names. We hope all seceders, especially old members, will reconsider this matter.

A GARLAND OF FERNS.

Royal Osmund groweth tall,
 Lissome and strong and bold ;
 Fringing all the rivulet
 With crowns of green and gold.
 Rambling far o'er shadowed bog
 See Marsh *thelypteris* glide ;
 Fairy forests of its fronds
 The matted Sphagnum hide.
 Mantling all the rocky brink
 With leafy lacework neat
 Lady Fern peeps tenderly
 And seeks to bathe her feet.
 Hymen's filmy haze, around
 The mist-dewed cavern mouth,
 Steals away from contact with
 The rich and glowing South.
 Down the wall a tapestry
 Of Hart's-tongue lucent falls,
 Meet to be the vestment of
 Titania's elfin halls.
 Hair-stemmed gracile pennons gay
 The shimm'ring Oak Fern waves
 O'er the bank whose foliage
 The frolic streamlet laves.
 By the road meandering
 Thro' woodland light and shade,
 Cohorts of the Male Fern march
 Embroidering the glade.
 Here the great Broad Buckler Fern
 Flings beauty shoulder-high
 To greet the boughs that shelter
 It's verdure from the sky.

Shield Fern soft, the hedgerow's pride
 With vernal promise rears
 Bronze and silver symmetry
 Aglow with dewdrop tears.
 Over Common as we pass
 The Bracken's acres sway ;
 And Blechnum thrusts from under
 It's darting pecten-ray.
 Sun-kissed fragrance, drifting from
 The rock-strewn moorland, tells
 Of *montana's* clusters sweet
 Amongst the heather-bells.
 Moss-grown branch and crumbling wall
 The frond-clad ramparts raise
 Of Polypody murm'ring
 Phœbus Apollo's praise ;
 Bolder still in challenging
 The Sun God's noontide face,
 Wall Rue small and Ceterach
 The topmast crannies grace.
 Plenitude of frondage rich
 Does Nature's cup o'er-brim
 By field and fen and moorland,
 Mountain and sea-cliff grim.
 FRAS. W. THORRINGTON.

TREE FERNS.

From very earliest times ferns have been compelled to adapt themselves to the gradually changing conditions prevailing on our globe. Types which were fit under one set of conditions are often quite unfit under slightly changed conditions, and as the climate and conditions are never

quite stationary but always changing, vegetation is compelled to follow suit. The unfit are exterminated or decimated, and the fit survive and perpetuate themselves.

The organic world is governed by two opposing forces—heredity, and the tendency to vary. These forces, constantly acted upon by the varying climatic conditions due to the gradual cooling of the earth, are responsible for the infinite variety and complexity of organic life which we see around us.

During the carboniferous period, although there was a total absence of animal life, yet every neighbouring fern became a potential enemy. Warmth, moisture and food (both gaseous and solid) were the natural birthright of all, the only other absolute necessity was light, and this was necessarily limited by the superficial measurement of the earth's surface. Ferns shed their spores in lavish profusion, every square foot of land being crowded to suffocation with fern life, vegetation ran riot, millions of spores germinating where there was room, only for perhaps one adult plant. Then commenced the battle for the light. We may assume that the ferns which first made their appearance were not tree ferns, and that the strongest destroyed their less robust neighbours. Every fern which was unable to overtop its immediate neighbours would be itself overtopped and therefore destroyed. It became a case of *saure qui peut*, every fern for itself and the devil take the hindmost.

It may be regarded as axiomatic that any ferns possessing special qualities giving them an advantage, however slight, over their competitors in the struggle for existence will survive, and that this advantage will be transmitted to their descendants, often in an increased degree.

In the times of which we are speaking, it was inevitable that among such vast numbers of seedlings many new

qualities or capacities would be acquired. The most important quality at this time was the ability to build a stem. Any fern possessing this desideratum would, in the battle for the light, fight at an advantage proportionate to the height of its stem. The stems in the first instance would be only a few inches, but seedlings from the stem builders would inherit this capacity and some would excel their parents in this particular. With every succeeding generation the stems would lengthen, and the result would be the encouragement of an arborescent habit of growth, and the eventual evolution of a race of monstrous tree ferns with which it was impossible for ordinary ferns to compete. The exceptions were the small growing filmy ferns which were able to exist in semi-darkness, and the rhizomatous ferns, which, by attaching themselves to the stems, were able to exist as epiphytes upon the shoulders of their giant neighbours.

With the advent of animal life and the drier and less congenial conditions prevailing later, the fight for the light became less strenuous. The depredations of animals and the drying influence of the sun on the land thinned out the dense fern jungle. The struggle for existence still proceeded but on somewhat different lines, and the bone of contention became a contest for the possession of the places where existed the most favourable conditions for growth. From this time the tree fern population began to decline. The stem building weapon had become blunted and was fast becoming useless. It was no longer a vital factor in the perpetuation of fern life, but was somewhat of a handicap as it involved useless and unprofitable labour. Light could now be obtained without any extra exertion.

It will be observed that all tree ferns are evergreen, thus proving their origin at a time in the earth's infancy, when

the climatic conditions were most benign and uniform. The deciduous character in ferns was a measure of self-preservation forced upon them subsequently when the heavy cloud blanket was removed, and extremes of temperature began to be experienced, and the polar snows began to "steal like a ghost" upon a formerly warm and cosy world. In the earlier portion of this fern millennium, whilst the polar seas were quite hot, huge tree ferns practically monopolised the whole land surface. They had inherited or acquired the stem building instinct which had enabled them to conquer the world, but a few of their despised enemies had inherited or acquired another very vital quality, the absence of which quality among tree ferns was destined to prove the undoing of these otherwise invulnerable tree monsters. This was the quality of hardiness; they were able to hibernate, and thus protect themselves during the cold season, which began to make itself felt towards the end of the carboniferous period. Tree ferns were compelled to retreat before the advancing polar icecaps, having never acquired the deciduous character, and being very slow to accommodate themselves to the later colder conditions.

Correvoon says: "Tree ferns stand in the same relation to the vegetable carpet which to-day covers the earth, as do the giraffes, elephants, rhinoceroses and sharks to the animal world, that is to say they are the last remnants of races which were formerly numerous and prosperous, but are now on the verge of extinction. Weak and degenerate descendants of those superb giants which peopled the forests during the carboniferous epoch, tree ferns are to-day confined to moist and sheltered ravines in tropical countries, where they can still find in part their anterior conditions of existence. They retreat before the frost which, from the

north and south, advances menacingly upon our poor globe to such an extent that its crust is thickened and its mass is cooled. In New Zealand, where tree ferns are still abundantly represented, they are often called upon to endure the inauspicious influences of a climate which is now much too cold for them. They harden their tissues, bowing their heads to the storms, and solidifying their outer integument against the cold and the snow, but everything tends to the belief that in spite of their best endeavours, they will sooner or later disappear from these climates which are now too cold for them. The tree ferns of anterior periods suffered the fate of all beings of old origin, they retreated little by little before the new arrivals."

H. STANSFIELD.

THE FORMS OF SCOLOPENDRIUM V. CRISPUM.

Just as in other species the plumosums constitute the cream of the varieties, so in the Hart's Tongue fern the *crispums*, which correspond to plumose varieties, are acknowledged to be the most beautiful section. The curling or undulation of the margins is produced by an increased development of the leafy part of the frond in proportion to the costa or midrib. As in the plumose forms also the increase of the leafy tissue is accompanied by a thinner texture and generally by the absence, or extreme scarcity, of spores. The *undulatus*, as distinct from the true *crispums*, have increased leafy development with wavy margins but *without thinning* of the tissue and they all bear normal sori. An intermediate place is occupied by the fertile *crispums*, of which several have been found. They produce sori somewhat sparingly, or only occasionally, and are thinner in texture than the *undulatus* proper;

the margins are also generally more or less serrate or incised. Forms of this character have been found by the late Mr. R. Moule, Mr. E. G. Wrigley, Major Cowburn, Mr. A. B. Taylor, and others.

Of the barren or true *crispums* the oldest is Gray's form, to which the name *crispum* was first given. It is a very handsome fern and is largely grown as a market plant, being propagated by nurserymen from the bases of the stipites. It is deeply and regularly waved, entirely barren of spores, and does not attempt to be crested or multifid but is content to do one thing well. Bowden's form, found in the Lake district, is a somewhat similar fern but, being narrower, appears to be more deeply undulate; this is the best narrow form. Major Cowburn found a number of fine *crispums* in Monmouthshire, all resembling each other in being very broad with shallow undulations and serrate or incised margins. One of them is fertile and comes true from spores. The others are barren or nearly so. *S. crispum latum*, found by the late C. Jackson, was the earliest of the broad forms. The lower part of the lamina of the frond is separated from the rest by a short contracted or depauperate interval. For this reason it is but little grown now, being superseded by more perfect forms. *Crispum majus*, Jackson, *cr. majus*, Moses, and *cr. robustum*, Jones, are broad forms somewhat resembling each other, but *robustum*, Jones, has a short stipes and the fronds consequently tend to be crowded in a large specimen. *Crispum nobile*, Bolton, and *crispum*, Robinson, are both giant forms, broad, but less deeply undulate than the foregoing. Bolton's *nobile* is very fine and soon forms a large specimen. *Crispum grande*, Wills, is the finest of the broad forms and, in Mr. Henwood's hands, has produced fronds seven inches in width, and more deeply undulate

than either Bolton's or Robinson's form. The fronds, however, are rather blunt and rounded at the apex and proportionately shorter than the others, so that its habit is somewhat squat. Mrs. Stabler's form is a first-rate variety, having deeply undulate fronds, broad at the base and tapering to a sharp point. The foot-stalk is very long, so that a small plant with few fronds has a lanky appearance. In a large plant, however, the long stalks are a distinct advantage, as the fronds are well raised up and do not interfere with each other. This is a noble exhibition fern when well grown. *Crispum*, Keall, is another fine form of medium width and undulation, but with a very dark foot-stalk and midrib and a peculiarly glossy surface of a rich deep green, which contrasts well with the dark midrib. *Crispum*, Stansfield, was found by the present writer's grandfather, at Roundstone, Ireland, about fifty years ago. When grown in the open air, as at Clifton, it is one of the most distinct forms, standing out from all the rest; although deeply undulate the waves are somewhat flattened and consequently overlap each other like pleats. For this reason Mr. Lowe called it *crispum imbricatum*. When grown under glass the folds are less flat and tend rather to overlap the midrib behind the frond. *Crispum speciosum*, Moly, a plant preserved from extinction by Mr. Cranfield, and only recently distributed, is, we think, the finest of all the plain crispums, being deeply waved (fronds as deep as wide), a gigantic grower of perfect habit and without the least tendency to coarseness or eccentricity. *Sagittato-crispum*, Jackson, and *sagittato-crispum*, Wollaston, are as like each other as a pair of identical twins, of medium width and undulation with smooth (*i.e.*, non-serrate) margins and sagittate lobes at the base of the fronds; very neat and distinct.

Crispum fimbriatum, Stansfield, in its best form, is we think, the most beautiful of all the varieties of *Scolopendrium*. It is practically identical with "*Stansfieldii*," raised at Todmorden, and figured in Lowe's "Our Native Ferns" (a rather poor frond) and reproduced in Druery's last book (plate xxxviii., p. 253). The original *Stansfieldii* had been some years extinct when the present *fimbriatum* was raised from quite a different source by F. W. and H. Stansfield, at Pontefract. Two fine fronds of the modern type are figured by Druery on p. 235 in his last book. They show the beautiful fringed margins well, but both fronds are slightly crested, which we consider rather a defect, the best type having pointed fronds. The original batch were mostly (but not all) non-crested and no better forms have since been raised. There is a great tendency of late years for seedlings to be multifid or crested or even ramo-cristate but the normal outline is the most elegant. The late Mr. S. Cropper raised, from the Stansfield strain, a fine seedling which had long narrow fronds, richly fimbriate, and with neat rounded crests. The other so-called Cropper *fimbriatums* were simply reproductions of the original Stansfield batch. *Cr. fimbriatum* is usually barren when in its best form, but sometimes bears a few sori. Inferior seedlings are abundantly soriferous, and good forms can sometimes be raised from them.

Mr. Lowe combined *cr. fimbriatum* with *muricatum*, and the result is a very beautiful but somewhat miffy plant. It attempts too much for its health.

S. crispum Drummondiae is another fimbriate form which was originally found wild. It produced always a proportion of normal or nearly normal fronds, but the characteristic fimbriate ones were of great beauty having however a "switch-back" undulation of the midrib which spoilt the

habit of the plant. It was very inconstant and uncertain as to the production of fimbriate fronds. Mr. R. Bolton and Mr. Druery have both raised improved forms in which the inconstancy has been largely, perhaps entirely, eliminated. The switch-back and rather weak habit remains, with an increased tendency to cristation of the apices. The best forms are beautifully fringed and aposporous (see GAZETTE, Vol. II., pp. 156 and 237). If one must have a crested *crispum*, *S. crispum cristatum*, Moly, is the best. This is another of Mr. Cranfield's resuscitations from Moly's collection. It is deeply undulate, slightly serrate, and neatly crested; it is also slightly fertile. Miss Kitson's *crispum multifidum* is a fine form with rather narrow erect fronds. It is a good *crispum* and a fairly large grower, but is, we think, rather spoilt by the multifid apices. *Crispum ornatum*, Troughton, is a somewhat similar form.

S. crispum diversifrons, Jones, is a fertile form and a curiosity rather than a beauty, although a young and vigorous plant can be very attractive. As the name implies the fronds are various in form but generally have large basal lobes. The veins on the upper surface are large and prominent giving it a transversely grooved or tooled appearance, which is very characteristic and by which very small plants may be readily recognised.

All the forms of *crispum* are well worth cultivation, but for a small collection, where room is limited, we should vote for *speciosum*, Moly; *grande*, Wills; *fimbriatum* (best type): Mrs. Stabler's and Bowden's forms, and *sagittato-crispum*, Wollaston.

F.W.S.

A GLOSSARY OF FERN NAMES *(continued)*.

SCOLOPENDRIUM VULGARE.

acetabulum—a vinegar-cup (a form of *perlaferens*).

acrocladon—(see under *Athyrium f.f.*).

alatum—winged (the “wing” is really the edge of the frond beyond the marginal line).

albescens—becoming white.

albo-variegatum—variegated with white.

angustatum—narrowed (see *Athyrium* and *Lastrea*).

bimarginatum—doubly marginate (*i.e.*, on upper and lower surfaces).

blandum—pleasant, charming.

capitatum—having a head or large crest.

cervi-cornu—shaped like a stag's horn or deer's horn.

chelœfrons—claw-fronded, or with claw shaped fronds.

circinatum—curved round, like a circle.

concavo-capitatum—with crested head. Hollow or concave frond.

concavum—hollowed out, concave.

conglomeratum—rolled together, like a ball.

congregatum—collected together, like a herd.

conjungendum—yoked together, twin-fronded.

constellatum—a cluster of stars, clustered crests.

constrictum—drawn together, narrowed.

contractum—contracted (below crest).

cordatum—heart-shaped (in allusion to lobes at base of frond)

coriaceum—leathery.

cornutum—horned.

corniculatum—having little horns.

coronatum—crowned.

corymbiferum—(see under *Athyrium f.f.*).

crenatum—(see under *Asp. Ceterach*).

- crispissimum*—very curly.
crispum—(see under *Athyrium*).
crista-galli—a cock's comb or crest.
cristatum—crested (see *Blechnum*, &c.).
cristulatum—(see under *Athyrium* f.f.).
curiosum—curious
cymbaforme—boat-shaped.
dichotomum—forking again and again, repeatedly dividing into two parts.
digitatum—fingered (see *Athyrium* f.f.).
dimorphum—having two forms.
divaricatum—(see under *Athyrium*).
diversifrons—having differing fronds.
fimbriatum—fringed.
fissum—cloven (see *Adiantum*).
fissidens—split into tooth-like lobes.
fissile—cleft, split.
flabellatum—fan-shaped.
flavum—yellow.
flexuosum—full of turns, repeatedly bending.
glomeratum—formed into a ball.
grande—large, fine.
grandiceps—having a large head (see *Athyrium*).
gymnosorum—having naked sori.
hastatum—spear-shaped.
hebetatum—blunt, pointless.
hemionitoides—like a mule (i.e., having long ears).
imbricatum—tiled, having overlapping folds (see *Asplenium marinum*).
inæquale—irregular (see *Athyrium*).
incisum—cut in, slashed (see *Lastrea montana*, &c.).
inframuricatum—roughened (like a wall) beneath.
kephaloton—having a head.

- keratoides*—horn-like, branching like the horns of a deer.
laceratum—torn.
lacertum—"a lizard," a form of *sagittato-projectum*,
resembling a lizard.
laciniatum—pleated or folded.
lacteum—milky (a variegated form).
lacteolum—milky white (a diminutive).
laudabile—praise-worthy.
latum—broad.
latissimum—very broad.
limbospermum—having sori on the margin or edge.
lineare—very narrow (*see Asplenium Ad. nigrum*).
lonchophorum—lance-bearing.
longipes—having a long foot (-stalk).
macrosorum—having large sori.
marginatum—having a marginal ridge beneath.
muricatum—roughened like a wall.
nitidum—shining, polished.
nodosum—full of knots (*i.e.*, the stem).
nudicaule—having a naked stem (devoid of scales).
omnilacerum—(*see under Polypodium vulgare*).
palmatum—hand-shaped.
papillosum—bearing warts, teats, or nipples, or out-
growths.
patulum—open, spreading, wide.
pectinatum—comb-like, having long teeth.
periferens—bearing a bag.
pinnatifidum—cut to resemble wings or pinnæ.
plumosum—feathery (*see Adiantum C. V.*, &c.).
polycuspis—having many points.
polyschides—many splintered, or with many splits.
projectum—having projecting lobes.
ramigerum—branch-bearing.

- ramosum*—branched.
ramusculum—having little branches.
reflexum—bent backwards (*see Athyrium*).
reniforme—kidney-shaped.
rigidum—stiff, inflexible.
rimosum—full of cracks or fissures.
robustum—stout, strong, like an oak.
rugosum—wrinkled.
sagittatum—arrow-shaped, winged at base.
sagittato-projectum—arrow-shaped, with projections.
sagittato-cristatum—arrow-shaped and crested.
sculpturatum—carved or engraved.
serratum—saw-like (*see Blechnum*).
serrula—a little saw.
sinuatum—wavy on margin.
sinum—a fold or pocket (a form of *periferens*).
speciosum—showy, handsome, good-looking.
spirale—twisted spirally.
supralineatum—having lines on upper surface.
suprasoriferum—bearing sori on upper surface.
tortuosum—full of twists or turns.
transverso-lobatum—having lobes crossing each other.
truncato-cornutum—abruptly shortened and bearing a
 horn.
turgidum—swollen, distended.
uncinatum—hooked, barbed (at base).
undulatum—waved.
unguiceps—claw-headed (crests like a bird's foot)
variabile—variable in form.
variegatum—particoloured.
venosum—veined, full of veins.
viviparum—bearing living young (*i.e.*, bulbils).

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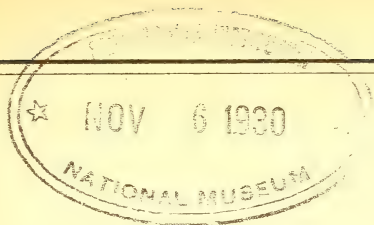
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EDITORIAL NOTES.

The "Blackthorn winter" being now over (May 10th), ferns, in the South, are looking very promising, especially those which have been slightly sheltered from the East winds of April. In the North, probably, the crowns have been mostly at rest during the dry Spring, and that is all in their favour. We hope soon to receive notes from our members with regard to new finds, seedlings and other matters of general interest. In this issue are some notes on our Reading ferns. No doubt other members will have matter to communicate of equal or greater value. Please let us have some of it for our next issue. Short notes will be welcome, as well as more elaborate articles. The glossary of names being concluded so far as varieties are concerned, the present issue contains a glossary of generic and specific

names, in the compilation of which, as before, the Rev. Canon Kingsmill Moore has collaborated with the Editor.

We learn that the collection of ferns belonging to the veteran fern-grower, Mr. W. H. Phillips, of Lemonfield, Holywood, Co. Down, is for sale.

THE AUGUST MEETING.

The Annual Meeting of the Society will this year be held at 10 a.m. on August 8th (*not* August 1st), at the George Hotel, Chard, Somerset, where good accommodation for visitors is available, as also at the Victoria Hotel. No doubt some members will arrange to get to Chard on Friday, August 5th, and to stay for a few days after the meeting. The journey is a considerable one for Northern members, but it is hoped that the change of scenery and surroundings, as well as of species of ferns, will make it worth while for comparatively distant members to spend a few days in the neighbourhood. The surrounding country provides rich fern-hunting ground in *P. angulare* and *aculeatum*, *Scolopendrium*, various *Aspleniums*, etc. It is classical ground, being in the field of Moly's and Wills's activity, but has not been overhauled by any recognized pteridologist for more than twenty years, so there has been plenty of time for new variations to arise, some of which it is hoped will reward the search of our members. There is but little hill-climbing to be done (though hills are not entirely absent), but ferns are practically everywhere in the hedges and lane sides, so that elderly persons of limited activity will have a fair chance of a prize as well as the more athletic juniors. We hope to have a good muster of members.

MY FERNS.

The summer through I'd gladly spend each day
 In watching fronds that airily unfurl;
 Their bannerets the morning dewdrops pearl
 Until the mounting sun with ardent ray
 The promise of the dawning shall betray,
 And steal the jewel from each silvered curl.
 He would be in his soul a very churl
 Who would not joy to view that gracious play.
 Some throw aloft each waving croziered head
 In bold defiance of the fervent noon,
 Though many flow'rets wither in that glare
 That one deemed fitter to Apollo wed.
 Yet best I love the ferns that crave the boon
 Of sheltering shade, and tender, watchful care.
 FRAS. W. THORRINGTON.

 FERN GOSSIP.

A little over a year ago we received from Canon Kingsmill Moore "a pinch" of prothalli, showing young fronds, from a sowing of his own of a strain which he calls *P. angulare falcato-pinnulum*. The pinch quickly resolved itself into some 15 or 16 plants, all showing more or less falcate and divided pinnules. The leading plant now (May 10th) has fronds over a foot in length, of very fine falcate divisilobe character, and promises to be a very ornamental fern, far surpassing Moly's *divisilobum falcatum* (BRITISH FERN GAZETTE, Vol. III., p. 278), even when the latter is fully developed, and, of course, greatly superior to what one expects from a young plant of Moly's find. Two other plants of the little batch were of a different character,

although evidently from the same strain. They were semi-translucent in texture, which appearance in seedlings we connect with *pulcherrimums* or very fine plumose-divisilobes. As is usual also, the translucent seedlings proved to be slow growers, and much more foliose than the bulk of the batch. They are still small, but very promising, and it is possible we may have here a new source of the *pulcherrimum* character in *angulare*. We think very highly of this falcate strain, and shall watch developments with great interest. Unfortunately, the raiser is not sure of the parentage, but thinks it may be from a West Cork find of his own. It is possible that it may be indirectly from Moly's find, since the latter has previously given some improved seedlings which have been widely distributed. In any case it is a long step in advance of anything previously raised from Moly's strain. The original *P. a. pulcherrimum variegatum*, Moly, has this year metaphorically turned over a new leaf, and is sending up some six or seven fronds, now 20 inches long and still expanding, all free from defects or irregularities with the exception of one slightly contracted pinna near the tip of a frond. Seeing that this plant has for forty years never failed to send up fronds more or less ragged towards the tips, this is somewhat of a record, and the plant should be worthy of a pilgrimage from Orkney or Shetland to see it in perfection. Along with the original is a seedling plant, nearly as large and equally perfect, which we had relied upon to beat the original. Moly's plant, thus put upon its mettle, has spurred ahead, and may yet win the race for supremacy against its own offspring. Growing in the same frame is another fern, raised from spores of a plumose-divisilobe (foliosum), which we consider the finest *angulare pulcherrimum* at present known. It is superior in cutting to Moly's find, every frond is without a

flaw, and both upper and lower pinnules have the pulcherrimum character well developed, whereas in Moly's plant the upper pinnules are practically normal. The new fern is moreover a fairly decent grower. It is worthy of a pilgrimage from Mecca. It was almost killed by the severe winter of 1916-17 (being then in a pot), and only made one frond in 1917. The seedlings from *P. a. pl. rarefactum* are mostly doing well, but one of the best pulcherrimums has failed to start, although treated with every care and growing among a number of other choice things, all of which are doing well. This is the fly in the ointment, but there is plenty of good clean ointment left. The parent *rarefactum*, growing in the open air, is a perfect shuttlecock, with fronds two feet high, and not yet fully developed. It was described by a connoisseur visitor last year as "the finest thing in the garden." and it promises to be better this year than last, always provided that no severe frosts or storms occur in late May or June. *Asplenium trichomanes incisocrispum*, Clement, is almost as fine as the specimen figured in the GAZETTE (Vol. I., p. 75), although probably not so large, as the fronds (not yet fully developed) are only about seven inches in length. The plant was, however, broken up last year. This is certainly the finest form of the species, and is hardly likely to be surpassed. *Woodsia alpina* began to grow in January, and was in full frondage by the middle of March. In its native habitat it is doubtless still sleeping under the snow, or only just beginning to wake. *Cystopteris montana* is only just peeping through the soil, but has probably not yet become acclimatized here. *Athyriums*, out of doors, also are mostly only just starting into growth, thereby showing their wisdom under our erratic climatic conditions. *A. f.f. kalothrix*, under glass, is well developed, but has recently

manifested the eccentricity of genius by throwing up a *perfectly normal* frond, although this particular plant has been singularly true for many years, having only very occasionally shown a pinnule or two of plumose character. In Mr. Henwood's collection a plant of the original *A. f. f. unco-glomeratum*, which had kept perfectly true for nearly fifty years, has this year developed several fronds of *acrocladon* character, thus reverting partly to its parental form. Plants of this variety, raised by apospory, have been known to do this before, but not, so far as we are aware, the original. That lovely fern *Polypodium dryopteris* "*plumosum*" is a true *plumosum* only in the young state before it reaches the fruiting stage; afterwards it becomes a *crispato-foliosum*. It is, in both conditions, a beautiful and distinct thing, but the *plumosum* stage is so much more satisfying to the eye that we cannot help hoping that a permanently plumose (*i.e.*, barren) form will be raised. That this fern comes so freely from spores renders this the more probable. In our own small indoor fernery it is a veritable weed, and thousands of self-sown seedlings are pulled up annually. They vary very considerably, but chiefly in the direction of the normal. We have had several which have retained the plumose condition quite to full size, but, so far, all have eventually produced spores and taken on the crispate-foliose condition. Where, as here, the fern sows itself freely the best seedlings should be marked and preserved until they attain their final character. In this way a true and permanent *plumosum* should, sooner or later, be produced. A human tragedy in Reading last Christmas was followed by a fern tragedy. During the War, owing to the scarcity of fuel, Mr. H. Stansfield sent us his last scrap of *Asplenium marinum plumosum* in the hope that our possibly warmer climate might preserve its

life. As the plant was in a very low state of health it was entrusted to a neighbouring nurseryman, who had a warm house. The manager, Mr. Charles Holder, promised to give it personal attention and did so, with the result that the scrap slowly grew into a small but healthy plant. It was in this condition at the end of 1920, when Mr. Holder was knocked down by a street vehicle and was taken, severely injured, to the hospital, where he lingered for several weeks and eventually died from secondary pneumonia. Incredible as it may appear, we heard nothing of the accident or its result until a week or more after the poor man's death, and, on going round to the nursery, we found a new manager, who knew nothing of the fern, and *A. marinum plumosum* with every frond black and withered, the plant dried up and apparently dead. On close examination with a lens there appeared to be a trace of life in the crown, and the new man kindly promised to do his best for it. The plant has again made one or two tiny fronds, but a moderately-sized slug or woodlouse could easily devour the whole thing at a meal, and it is doubtful whether it can survive the vicissitudes of its condition. Is there another plant of it anywhere? We deeply regret the loss of Mr. Ho'der who was a most friendly and helpful man.

F.W.S.

HEREDITY.

That heredity plays a most important part in moulding both the physical structure and also the character of all living beings is incontestable. It is a legacy left to us, a legacy, moreover, which we are not at liberty to decline, although it would sometimes be greatly to our advantage to be able to do so. We are neither so good nor so bad

as we appear to be, and ought not to be credited with more than half the good, nor debited with more than half the bad which is apparent in us to outsiders. Our long-deceased ancestors are pushing us (as though with unseen hands) hither and thither to some extent in spite of our own wishes and endeavours. Cassius in his quarrel with Brutus says : " Have you not love enough to bear with me, when that rash humour which my mother gave me, and blood ill-tempered makes me forgetful ? " He thus infers that the " rash humour " in question is far from receiving his unqualified approval. It was an incubus which he would gladly shake off, but was powerless to do so. But " revenons à nos moutons."

The cultivation of ferns affords much scope for the investigation of heredity, and we may learn both charity and humility by noting the effects of heredity as exemplified in these interesting subjects.

In the case of any such well defined species as *Asp. septentrionale* or *Allosorus crispus*, which so far have yielded us no varieties, the pull or push of heredity from tens of thousands of generations is all in one direction, and tends therefore to uniformity and stability of character, there being no disturbing influence, in the shape of recent ancestral varieties, to complicate matters. Many of our fern varieties have, however, been built up in successive stages, or from various combinations, and the hereditary influence is in many and possibly diverse directions, tending therefore to the production of diverse and complex structure in the progeny, but the more numerous and diverse the hereditary impulses, the more unstable the resulting variety.

We may examine a thousand seedlings of *Asp. septentrionale* without finding a single Caliban, but the result is

quite different if we inspect seedlings from *S. curiosum* or *A.f.f. Craigii*. Here we meet with quite a large proportion of degenerates; stunted and deformed monstrosities, mostly cripples and imbeciles, who owe their unfortunate condition to the malign influence of heredity.

Some of our fern varieties have apparently leaped at one bound from the normal; these are what we call "wild finds," and are highly prized as indicating where we must look if we wish to trace the first step in variation. Other varieties have been obtained by a process of selection of the best types appearing in each sowing, and have been brought to their present standard of perfection in three or four generations. By continuing this process through a series of fern generations, a considerable degree of perfection can be attained, the structure becoming more complicated and the progeny more heterogeneous with each generation. There is no finality to this fern evolution until absolute sterility is reached.

One would naturally expect the parent plant to be the main factor in determining the character of the succeeding generation, and this is usually but not invariably the case. It is impossible in the present imperfect state of our knowledge to estimate with mathematical accuracy or in concrete figures the hereditary influence of each generation, as in the case of the parallelogram of forces, although the general result from a number of ancestors may work out in somewhat similar manner.

If several ancestors possessing differing characters were all acting convergently and with equal forces, we should expect a uniform blend of all the ancestral types engaged. But if the forces were unequal we should expect the more recent and therefore the more powerful to have a preponderating influence in deciding the character of the progeny.

We can, however, imagine these ancestors acting divergently (each one working for its own hand and trying to carve out as large a following as possible from the general spoil), in which case we should expect all the ancestral types to be represented in greater or lesser proportion according to the proximity or remoteness of each ancestor.

In a sowing of *S. v. grandiceps* the writer has had 99 per cent. true to the parent plant, but in a more recent sowing only one true *grandiceps* appeared, the rest being a full crop consisting of 50 per cent. slightly digitate and 50 per cent. normal forms. On the assumption that the parent plant had been built up in five successive stages, we can conceive the possibility of the hereditary impulses of the last four generations being so arranged as to produce a state of equilibrium among themselves, when, of course, the long line of normal ancestors and the first break (probably a simple multifid form) would be left with a free hand, and would therefore be able to shape the destiny and mould the character of the young brood in spite of the hereditary influence of the more powerful but conflicting later generations. Thus exemplifying the old saying: "When thieves quarrel, honest men come by their own."

Heredity is not the only factor in determining the character of the succeeding generation. In addition to the innate tendency to vary, there is always the probability of a cross with some other variety still further to complicate matters, and as heredity plays its part with both parents, we get a combination of two varying forces influencing the character and structure of the young brood, often with strange results. If the seedlings have any wills of their own, they must in face of such a formidable and perhaps sinister combination, be an almost negligible quantity.

The variety *P. v. Cornubiense multifidum* has an extremely

complex structure. *Imprimis*, the *Cornubiense* parent, possesses a dual personality, a sort of Jekyll and Hyde arrangement in which the two characters *vulgare* and *Cornubiense* are each struggling for the mastery. In early youth *P. Cornubiense* is a perfect model of propriety, but during adolescence we notice very small normal fronds (about 3 per cent.) furtively make their appearance, to be followed in a few years as the plant becomes hardened in crime by many full-sized normal fronds, which in ranks and squadrons shamelessly flaunt themselves. At a still later stage there is a general degeneration of character which is sad to behold.

The other parent *P. bifido-cristatum* is a perfectly fixed and constant variety and has apparently married both Jekyll and Hyde. The seedlings have inherited constancy a regards cristation from one parent, and variability in the matter of dissection from the other. An additional virtue has thus been grafted upon both Jekyll and Hyde, but the relative *status quo* still persists.

H. STANSFIELD.

THE JUDICIOUS USE OF SHELTER.

(COLUMN FOR BEGINNERS.)

Nearly all ferns require a certain amount of shelter from cutting winds (especially East winds) as well as shade from scorching sun. Apart from these elementary requirements, however, temporary shelters of a simple kind are of great service, especially when the ferns are making their spring growth, at which time East winds and sudden frosts are particularly prevalent. In late autumn, too, temporary shelters are useful to preserve the fronds of evergreen ferns such as *Polystichums* and *Scolopendriums*. These ferns

build up their crowns for the spring growth during the winter and, for this purpose, it is necessary that their fronds should not be prematurely destroyed or broken. During mild weather in the winter the plants are best left entirely unprotected as they are then less likely to make precocious growth. In the spring, also, so long as the crowns are not starting into growth, shelter should be avoided. They are only too ready to spring into life during the mild weather which we often experience in January and February, and the growth then made is almost sure to be cut down by frosts and East winds in March and April. It is much the best if they can be kept completely at rest until all danger of East winds is over, but this counsel of perfection can only rarely be put into practice. At the time of writing (April) most of the evergreen ferns have made several inches of growth and the young fronds are now being buffeted by biting East winds with scorching sun by day and sharp frosts at night. This is just when a little shelter is most valuable. Every bell-glass should be brought into use and broken ones, if not too badly smashed, will be found more useful than whole ones provided the sound side of the glass be set against the wind. The tender fronds are sheltered from the wind and frost, while the ferns are not stimulated to further growth as they would be by close jars. Mr. Henwood, that prince of cultivators, uses bottomless wooden boxes, 15 to 18 inches square, which are placed around the ferns in the autumn, thus sheltering and supporting the fronds while leaving the crowns open to the air. In some cases a lid for the box is made of a pane of stout glass which thus completely protects the occupant from winds, severe frosts, cats and birds, all of which are, at times, capable of doing considerable damage. During mild weather at all times and during

only moderately severe weather in winter the glass covers are left off, but are immediately put on in case of a spring blizzard. The young fronds can be thus enabled to defy April storms, whether of wind, snow, or hail, and on the return of mild weather the ferns are able to resume growth as if nothing untoward had happened. Ferns which have been thus cared for have a very different appearance in June from those which have been battered by hail storms and cutting winds, broken down by snow or squatted upon by cats during their period of tender growth. Even without the covering panes of glass the boxes are a great help to the young growths, as they form a complete protection from East winds which occur practically every spring and which do more damage than all the rest of the above-named enemies combined. F.W.S.

GLOSSARY OF GENERIC AND SPECIFIC NAMES.

ADIANTUM—the Greek name for the same fern, derived from *Adianton*, “not wetted,” in allusion to the faculty the fronds have of throwing off drops of water.

Capillus-Veneris—Latin “Venus’s Hair,” from the black wiry stems.

ALLOSORUS—Greek, “differing sori,” referring to the fact that the fertile fronds are different from the barren ones. *Soros* (Greek) means a heap.

crispus—curly.

ASPIDIUM—Greek *Aspidion*, “a small shield,” from the shield-shaped indusium which covers the sorus.

ASPLENIUM—from Greek *Asplenion*, “without spleen”—spleenwort, the plant being supposed to be medicinal for disorders of the spleen.

Adiantum-nigrum (Linn.)—probably formerly confused with the true Maiden-hair (*Adiantum*) of the Greeks, and afterwards called black to distinguish it, although the stems are neither so black nor so hair-like as those of *Adiantum*.

fontanum (Presl)—“pertaining to springs or fountains.” Probably it may be found in Switzerland growing on rocks down which water trickles.

Germanicum (Weiss)—“pertaining to Germany.” It is, of course, not confined to that country.

lanceolatum (Hudson)—“like a small lance,” from the outline of the fronds in contradistinction with its nearest ally *A. Adiantum-nigrum*.

marinum (Linn.)—“pertaining to the sea,” from its habitat.

Ruta-muraria (Linn.)—“Wall-rue,” from its resemblance to rue and to its common habitat upon walls.

septentrionale (Linn.)—“relating to the seven” (stars of the Great Bear), hence Northern.

trichomanes (Linn.)—the Greek name for this fern, from Greek *thrix* “hair.”

viride (Hudson)—“green,” to distinguish it from *A. trichomanes*, its nearest ally.

ATHYRIUM—from Greek *Athyros*, “without door or lock”: supposed to be an allusion to the early opening of the indusium.

filiæ-fœmina (Bernhardi)—lit. “female-fern,” from its slender feminine grace as opposed to the robust and sturdy habit of the “male-fern.”

BLECHNUM—from Greek *blechnon*, a fern.

spicant (Desvaux)—*spicant* is neither Latin nor any other language. Mr. Wollaston considered it to be a mistake by an old copyist for *spicans*, “sticking up” like an ear of corn.

BOTRYCHIUM—from Greek *botrochos*, a cluster or bunch of grapes, referring to the cluster of capsules in the fertile frond.

lunaria (Swartz)—“moon-like,” from the shape of the pinnæ of the barren frond.

CETERACH—a corruption of *Chetherak*, a word of either Arabic or Celtic origin—meaning unknown.

officinarum—lit. “of workshops or offices,” in allusion to its former use as an official medicine.

CRYPTOGRAMME—from Greek *krupton gramma*, “hidden writing,” from the concealed lines of sori.

CYSTOPTERIS—from Greek *kustis pteris*. Lit. “bladder fern,” from the thin dome-like skins, like little bladders, which cover the spore heaps.

alpina—pertaining to the Alps or other mountains.

fragilis—brittle.

montana—pertaining to mountains.

regia (synonym of *alpina*)—royal.

DRYOPTERIS (the newest and oldest name for the genus *Lastrea*)—from Greek *drus pteris*, “oak-fern.”

GYMNOGRAMMA or GYMNOGRAMME—from Greek *gymnon gramma*, “naked writing,” from the naked lines of sori.

leptophylla—from Greek *leptos*, “thin or fine,” *phyllon*, “a leaf.”

HYMENOPHYLLUM—from Greek *hymen phyllon*, “with a leaf like a thin membrane.”

Tunbridgense—from the locality where first noticed.

unilaterale—“one sided” from the shape of the pinnæ.

LASTREA—the Latinized name of M. de Lastre, a French botanist.

œmula (Brackenridge)—emulating, rivalling, simulating, from its similarity to allied species.

faenisezii (Watson)—“of hay-making time,” from its odour of drying hay : this is an appropriate name, although not the first in order of time.

aristata (Druce)—“bearded like grain,” from the fine spinulose teeth.

cristata (Gray)—“crested” : the application is obscure, but this name was originally applied to a group of ferns, including *dilatata* and *spinulosa*.

dilatata—widened, extended laterally.

Filix-mas—“Male-fern.”

paleacea—“chaffy,” from the character of the scales.

propinqua—“near,” from its close alliance with *Filix-mas*.

pseudo-mas—“false male,” to differentiate it from the true male fern.

montana (see under *Cystopteris montana*).

oreopteris Greek from *oreios*, “mountainous,” *pteris*, “a fern.”

remota—“distant” ; the application is obscure.

rigida—“stiff.”

spinulosa—“having little spines” ; from the sharp teeth.

thelypteris—Greek *theleia pteris*, “feminine fern.”

OPHIOGLOSSUM—from Greek *Ophis glossa*. “a serpent’s tongue,” from the slender tongue-like fertile part of the frond.

lusitanicum—pertaining to Lusitania or Portugal.

vulgatum—common.

OSMUNDA—derivation unknown.

regalis—"royal," from its majestic habit.

PHYLLITIS—leaf-like, from Greek *phullon*, a leaf.

POLYPODIUM—Greek *polus pous*, "many feet or many footed"; from the numerous foot-like rhizomes of *P. vulgare*.

calcareum—pertaining to limestone.

Robertianum—"Robert's"; possibly from a fancied resemblance in its odour to that of *Geranium Robertianum* (see BRITISH FERN GAZETTE, Vol. III., p. 15).

dryopteris—Greek *drus pteris*, "Oak fern."

phegopteris—Greek *phegos*, which is a species of oak, distinct from *drus*. Possibly confused with Latin *Fagus*, a beech.

vulgare—common.

POLYSTICHUM—from Greek *polus stichos*, "many rows"; from the numerous rows of sori.

aculeatum—prickly.

angulare—angular; presumably from the square-shouldered pinnules as compared with the wedge-shaped ones of *P. aculeatum*.

lonchitis—Greek *lonché*, "a lance"; presumably from the little spines which fringe the pinnæ.

PSEUDATHYRIUM—false *Athyrium*.

PTERIS—the word is Greek for a kind of fern, possibly the bracken; it is derived from another Greek word, *pteron*, "a feather or a bird's wing."

aquilina—"pertaining to an eagle"; from the size of its fronds or "wings" as compared with other Northern ferns.

SCOLOPENDRIUM—*skolopendrion* is the Greek name for the same plant ; from the resemblance of its lines of sori to the legs of a centipede or *skolopendra*.

vulgare—common.

TRICHOMANES—the Greek name for *Asplenium trichomanes* (used by Dioscorides and Pliny), from Greek *thrix*, “hair,” in allusion to the hair-like stems of that plant. The name was later transferred to the Bristle fern in allusion, presumably, to the bristle-shaped receptacles of the sori.

radicans—“rooting,” from the running rhizome which makes roots along its course.

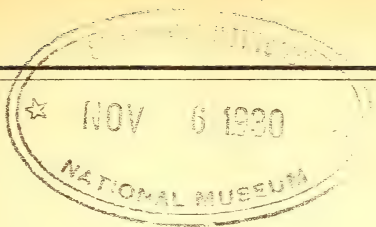
WOODSIA—the Latinized name of J. Woods, a British botanist.

alpina—(see under *Cystopteris*).

hyperborea—lit. “beyond the North wind” (*i.e.*, very far Northern).

Ilvensis—pertaining to the Island of Ilva or Elba.

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EDITORIAL NOTES.

We have received from Mr. R. Whiteside of Lancaster, a letter which finally settles the question of the origin of that curious and beautiful fern *Athyrium f.f. cristatum setiferum* which has been a matter of some controversy. In 1902, on the Society's excursion to Long Sleddale, Mr. W. H. Phillips found a large clump of lady-fern which he thought "had something in it," although its character was at the time somewhat indefinite. Mr. Phillips took home a piece, and several other members did the same, though most were sceptical about the value of the find. Next year, 1903, Mr. Phillips exhibited a beautifully crested *Athyrium*, which he declared was the plant he had taken home from Long Sleddale the previous year. As no one else was able to show or report a similar plant some doubt was entertained as to whether Mr. Phillips might not have made a mistake and an accidental seedling from one of the many crested *Athyriums* might not have taken the place of the Long Sleddale

plant. Mr. Phillips gave a division from his plant to the present writer, who was convinced of its distinctness and independent character. Mr. Whiteside, who was not present at the meeting in 1903, now sends fronds from the Long Sleddale plant, a piece of which was given to him at the time, and these are *identical with those of Mr. Phillips's plant*. Our veteran late vice-president's accuracy and carefulness are therefore triumphantly vindicated. The plant is one of the finest crested *Athyriums* ever found wild, having some general resemblance to *A.f.f. formoso-cristatum*, but the mossy crests are made up of fine bristling points, somewhat like the terminations in *A.f.f. acrocladon*. The plant has an odd habit of throwing out an occasional pinna longer than the rest, these being occasionally so conspicuous as to resemble small branches. The plant has nothing in common with *A.f.f. setigerum* or its sub-varieties, the bristly terminations being confined to the crests and not appearing upon the pinnules.

We are glad to report that *Asplenium marinum plumosum*, referred to in " Fern Gossip " in our last issue, and now again in the Editor's possession, is making a bid for life. The whole plant could be buried under a threepenny piece, but it looks healthy. In the meantime Mr. Henwood has been to Kew to inquire if the plant were in existence there, but was told " We had it but lost it." The same answer was returned with regard to *Adiantum Cap. Veneris Cornubiense* and *Asplenium Ad-nigrum microdon*. Any member possessing plants of any of these ferns has a great responsibility to posterity.

We understand that Mr. Phillips's series of Nature prints of British Ferns, by the late Col. Jones, is for sale, as well as his collection of ferns.

THE AUGUST MEETING.

The 26th Annual Meeting of the Society was held on August 8th, at the George Hotel, Chard. The following members attended: Mr. W. B. Cranfield (President), Messrs. Edwards (Manchester), T. E. Henwood (Reading), C. Henwood (Hon. Sec., London), Sheldon (Woodford), Stephens (Horsham) and Dr. Stansfield (Reading).

The Hon. Secretary's report showed a falling off of members. The Treasurer's report, whilst showing a balance at the bank, was noticeable for two issues of the GAZETTE unpaid for, which would really leave a considerable deficit.

Upon the election of officers for the coming year Mr. W. B. Cranfield was again unanimously elected President. Mr. J. J. Sheldon, of South Woodford, was added to the Committee, upon the proposition of Mr. T. E. Henwood, seconded by the President. Mr. Charles Henwood was again elected Hon. Secretary, with the office of Treasurer as well; this was proposed by Dr. Stansfield and seconded by Mr. Edwards.

The following is the complete list of officers:—

President.

Mr. W. B. CRANFIELD, East Lodge, Enfield Chase, Middlesex.

Vice-Presidents.

Mr. ALEX. COWAN, Penicuik, Scotland.

Dr. F. W. STANSFIELD, Reading.

Mr. J. J. SMITHIES, Kendal.

Revd. Canon KINGSMILL MOORE, D.D., Dundrum, Co. Dublin, Ireland.

Hon. Secretary and Treasurer.

Mr. CHARLES HENWOOD, 21, Clifton Road, Maida Vale, London, W. 9.

Auditor.

Mr. J. J. SMITHIES, Boundary Bank, Kendal.

Committee.

Mr. J. EDWARDS, Manchester.

Mr. T. E. HENWOOD, Reading.

Mr. H. RELTON, The Lizard, Cornwall.

Mrs. GROVES, London.

Mr. WHITESIDE, Lancaster.

Mr. WHITWELL, Kendal.

Mr. J. J. SHELDON, South Woodford.

(together with the President, Vice-Presidents and Hon. Secretary and Treasurer as members *ex officio*).

Editor of the GAZETTE.

Dr. F. W. STANSFIELD, 120, Oxford Road, Reading.

It was resolved that the meeting in 1922 should be at Llanberis, North Wales, on the Monday following the August Bank Holiday, subject to the district being found suitable by the President and Editor.

The President exhibited a series of fronds of choice ferns, including *P. aculeatum pulcherrimum*, Druery; *P. acul. pulcherrimum plumosum*, Green; *P. aculeatum densum*; *P. angulare divisisilobum plumosum Baldwinii*; *P. ang. div. plumosum erectum*, H. Stansfield; *P. ang. divisisilobum foliosum variegatum*, Harris; *P. ang. pulcherrimum variegatum*, Moly; *Polypodium v. omnilacerum* (Oxford variety); *Scolopendrium v. crispum speciosum*, Moly, &c. Another frond of special interest was one apparently of *P. angulare plumosum grande*, Moly, but which Mr. Cranfield said was a seedling raised from spores of *P. ang. pulcherrimum variegatum*, Moly. Dr. Stansfield said he had raised a similar, but not quite identical, form from the same source.

This was considered significant as pointing to a seedling origin of Moly's grand *plumosum*, hitherto assumed to have been found wild, although there is no record that Mr. Moly ever said so.

It was decided that the granting of certificates for new ferns (which had been in abeyance during the war) should be resumed, and certificates of the Society were awarded as follows :—

To Mr. W. B. Cranfield for *Polystichum aculeatum pulcherrimum plumosum*, Green ; *Scolopendrium v. crispum speciosum*, Moly ; *P. angulare percristatum*, Cranfield (raised from *P. a. cristatum*, Hawkins) ; and *P. angulare divisilobum plumosum erectum*, H. Stansfield.

To Dr. F. W. Stansfield for *P. angulare plumosum rarefactum*, H. Stansfield ; and *P. aculeatum pulcherrimum*, Drury.

To Mr. T. E. Henwood for *Scolopendrium vulgare crispum fimbriatum muricatum*, Lowe.

To Mr. T. Bolton (retrospective) for *Asplenium trichomanes inciso-crispum*, Clement.

To Mr. W. G. Baker, Botanic Gardens, Oxford, for *Polypodium v. omnilacerum*, Oxford variety.

To Mr. M. Harris, Clifton, for *Polystichum angulare divisilobum foliosum variegatum*, Harris.

A copy of the Society's balance sheet, when audited, will appear in the next issue of the GAZETTE.

Subscriptions for the new year are now due and members will oblige by sending the amount owing as early as possible to the Hon. Secretary and Treasurer, Mr. C. HENWOOD, 21, Clifton Road, Maida Vale, London, W. 9.

THE CHARD EXCURSIONS.

The Chard meeting, with its associated excursions, proved to be one of the most successful from the fern-hunting point of view, that the Society has ever held. Seven members attended and one visitor. The district has varied geological characters, being partly calcareous and partly on gravel and peat. Consequently the number of species met with was very considerable. *Polystichum angulare* and *Scolopendrium vulgare* were the commonest kinds, while *Lastrea filix-mas* and *L. pseudo-mas* were almost equally plentiful. *Polypodium vulgare* was pretty generally distributed and *Polystichum aculeatum* was also fairly abundant, the plants being in many cases very fine and well grown. The lady fern, *Lastrea dilatata* and *Blechnum spicant* were met with off the lime, but were local in their distribution, although plentiful in patches. Of *Aspleniums* the commonest was *A. Ad-nigrum* with *trichomanes* rather a bad second. *A. ruta-muraria* and *Ceterach* were seen here and there, but could not be called common. *Osmunda* was said to grow in the district but was not seen. Mountain species, such as *Asp. viride*, *Polypod. dryopteris*, *phegopteris* and *calcareum* were also not noted. *Cystopteris fragilis* was only once seen.

The hunting was mostly of the hedge-bank and wayside kind, and consequently involved a minimum of labour, but the members were somewhat handicapped by the recent activity of the hedge-cutters, who had almost everywhere slashed and shaved the hedges (and with them the ferns) to a smooth surface. Notwithstanding this disadvantage it was possible generally to find stumps of fronds and occasionally entire ones within the sanctuary of the hedge. The district was said to be suffering from drought but was much

greener and fresher than any the party had seen elsewhere and presented a marked contrast, in this respect, with the dry and parched condition of the home counties, particularly the Reading district. On Saturday, August 6th, a short walk was taken late in the afternoon in the immediate neighbourhood of the town where plenty of ferns were seen but no varieties, with the exception of an undulate form of *Polypodium vulgare*, by Mr. Sheldon. On Monday, the day of the meeting, the afternoon was spent in a visit to the village of Thorncombe, the former home of the famous hunter Dr. J. S. Wills. His one-time residence, Green Hill, was found, and the present owner's wife, Mrs. Wilde, kindly invited the party to look round the garden. It contained plenty of ferns but mostly normals, although a few traces of the occupation of a fern-lover were seen in the shape of *angulare acutilobes*, *decompositums* and *lineares*. The presence of a fern grower in the village was learned, but unfortunately he was not at home at the time of our visit. After tea in the village the party walked back to Chard Junction, and on the way Dr. Stansfield found a *P. angulare revolvens* or rather *revolutum* of good type, the pinnae being rolled back so that the frond formed a complete cylinder. Mr. Edwards also found a revolvent or recurved form of *aculeatum*. On Tuesday a lane was taken quite near the town and within easy walking distance of our centre. Quite early Dr. Stansfield found a brachiate form of *P. aculeatum*, quite a new type of variation in this species—one in which more varieties are desirable. The plant was a large one, and deeply buried in the hedge, only 2 or 3 pinnules showing above the cut surface; these called attention to the plant by their decompound character. Every frond was thoroughly brachiate, the lamina of the frond being nearly as broad as long. There seemed no tendency to

crustation but, as the tips of the largest fronds had all been slashed away, one could not be quite sure about this. There were several crowns and these were distributed, as far as they would go, among the company. Mr. Sheldon found a *polyschides* in *Scolopendrium* and also a neatly tripinnate *angulare*. The following day, Wednesday, it was decided to go a little further afield, and so a small wagonette was chartered to take the party to Howley, a hamlet some miles to the west, and close to the Devon border, where it was dismissed with instructions to meet the party in the evening. The members divided into two sections and some beautiful ferny lanes were found undamaged by the hedge-cutters and consequently the ferns were visible in their full beauty. Unfortunately, the day turned out thoroughly wet, and although this was good for the ferns and the district it did not conduce to the comfort of fern hunting for a more or less elderly party. In the afternoon it was decided to walk back to Chard, and on the way Mr. Edwards found a couple of crested *Scolopendriums* and a prettily variegated form of the spindle tree *Euonymus Europæus*. On Thursday the party had dwindled to three, and an expedition was made to Chardstock, some miles south of Chard, and over the Devonshire border. In the morning Mr. T. E. Henwood found a very pretty erect and rigid form of *Asplenium Ad.-nigrum* of neat habit, very compact and almost congested in character. This is another species in which more varieties are desirable. In the afternoon a lane was found extraordinarily rich in variations, especially of *P. angulare*, almost every other plant being either a *foliosum* or a *decompositum*, or some other departure from the normal. Mr. Cranfield soon came across a large *decompositum* form of *aculeatum*, which was considered rather a catch, as possibly the beginning of a

new series of divided forms in this not very variable species. Mr. Cranfield and Mr. Henwood both also bagged several *tripinnate* and *foliose* forms of *angulare*. Mr. Cranfield called Dr. Stansfield from the other side of the lane to inspect one of his *decompositums*, when the latter, within a few feet of it, descried a very fine *angulare divisilobum*, of lax and slender habit, with very finely divided pinnules and quite distinct from any other divisilobe at present known. The hunting here being so good it was decided to return and continue the search on the following day. This was done, but it was found that the gold mine was exhausted, and although a long day was spent in hunting nothing was found beyond a possible *congestum* and a *lineare* form of *angulare*. On Saturday, August 13th, the party finally broke up, and an end came to a very pleasant holiday, from which no one went home empty handed, and every one seemed well satisfied with the contents of his bag.

GOOD HUNTING IN MOLY'S COUNTRY.

The present writer, being unable to attend the Annual meeting at Chard, was fortunate in securing a fortnight's holiday on the South Dorset Coast.

The country here is a fern paradise, consisting of many little hills and valleys, the soil being a good water-holding clay, with plenty of loam and some chalk. This last has been supposed to encourage variation in *Polystichums*, and certainly here the differentiation of types within the limits of the normal is remarkable. It is a country of very few roads, not many lanes, and numerous cart-tracks, which last, where they cross the hills, become deeply worn by traffic and water action until they run between banks, up

to 15 feet high, which are just natural ferneries. The oldest and deepest tracks are apt to be abandoned as thoroughfares in favour of more convenient routes, whereupon they are neglected by the hedge-slashers to the common benefit of the ferns and their hunters.

The most abundant species are *P. angulare* and *Scol. vulgare*, these being almost ubiquitous. *P. aculeatum* in its typical form was only occasionally met with, though there were plenty of intermediate character. *Polypodium*, *Blechnum*, *Lastreas* and the two common *Aspleniums* are abundant in suitable spots.

Attention was concentrated on the *Polystichums*, and no variety of any other species was noticed, except the inevitable *marginate* and *multifid* forms of *Scolopendrium* in varying degrees of badness.

On the first real hunt, a very pretty *P. ang. congestum* was collected, densely imbricate and gracefully finished with slender tips to fronds and pinnæ. The next finds were a series of five belonging to the *acuti-divisilobe* section. The frequency of this form was perhaps explained when a large old plant of excellent *divisilobum* character was found near the top of a 600 ft. hill, where it had evidently been established for many years, and whence its spores had, no doubt, been widely disseminated.

A neat small-crested *P. ang. cristatum* was next acquired, in little more than seedling stage. It shows some tendency to be *percristate*, but is too young for final assessment.

The best thing found is a large *deltoid tripinnatum* with long curving pinnules, bearing 8 to 10 pairs of pinnulets. It was seen from afar, waving its fronds near the top of a high bank in one of the abandoned tracks before mentioned, and almost opposite to it was found a curious *P. ang. rotundatum*. One frond only of this was first seen in the midst

of a large clump of the normal form, and was thought to be a merely accidental or perhaps pathological variation. It was (unfortunately) gathered, as a curio, and only then was another exactly similar frond noticed. On investigation, the two were found to belong to a single small crown, an offset from the normal parent plant.

This is a quaintly pretty variety, and should it prove permanent, it will be of interest as being a bud sport from a perfectly normal *P. angulare*.

The question is sometimes asked, "Is fern-hunting worth while?" in these days of super-excellent varieties raised by selection. The present deponent would answer with a decided affirmative, at least as regards so rich a country as South Dorset.

T. STANSFIELD.

102, London Road,

Reading, *September*, 1921.

The half dozen ferns brought home by our correspondent are all good finds, the best being the *congestum* and the *tripinnatum*. The former is quite distinct from any other *congestum*, having beautifully setose pinnules and silky texture, very thorough and settled in character: the *tripinnatum* resembles Moly's and Jones's *deorso-pinnatums*, but is probably better than either. It should produce some good things from spores. The *acutilobes* (3) are all well marked varieties, but too young to show their final character at present. The large *divisilobe* was left behind as being too large to move with the means at command. It belongs to the same section as *divisilobum*, Bland, but is, of course, inferior to that splendid variety.—EDITOR.

NEW BREAK FROM *P. ACULEATUM* *PULCHERRIMUM*.

In the late Autumn of 1919 there appeared in a spore dish of *P. acul. pulcherrimum*, from which seedlings had been pricked off for several years, three tiny plants of a different character from any previously seen. The primary fronds were very slender, consisting each of three almost hair-like segments. From their appearance I expected them to produce extreme forms of *gracillimum*. The secondary fronds, however, quickly departed from the extremely tenuous appearance, and during 1920 the plants produced fronds of an indefinite character, apparently intermediate between *aculeatum* and *angulare*. This year, however, the three commenced by producing fronds of a much more divided character, and it is now (August) evident that they are *divisilobes* in *aculeatum*, quite a new character in this species, although one or two *acutilobes* have been found wild. The plants are moreover fairly freely bulbiferous, which character is so frequently associated with *divisilobes* in *angulare*. One of the three is already producing sori and probably the others will do so. It is possible that we have here the beginning of a series of *divisilobums* in *aculeatum*, as varied and as decorative as those found in *angulare*, and having also the firm habit and thoroughly evergreen character of the prickly shield fern, which is certainly one of the handsomest of our native species.

F.W.S.

FERNS AND THE DROUGHT OF 1921.

The drought of 1921 has had no rival in the twentieth century. This to many will seem an obvious understatement; beyond question fern cultivators will recognise that the test which their collections have had to endure was severe.

My garden in Co. Dublin stands high, perhaps 250 ft. above the sea ; and our water supply is such that even in normal years artificial watering has to be rigorously limited. The drought test, therefore, was applied in drastic form, so much so that in all probability ferns which at Cedar Mount came safely through the spring and early summer of 1921 are likely to be able to face similar conditions anywhere in the British Isles.

The first to suffer were the *Athyriums*—this is always so with me. For this reason I grow very few in the open, not twenty in all. With the exception of one or two bold growing forms they held out flags of distress by drooping, and those which could not be watered withered. I fear there is little likelihood of their recovering.

The troubles of *Lastrea Dilatata* came next. Among the most beautiful of our ferns, in the type, *L. D.* has few varieties, and for this reason is little grown. As no *plumose* form is yet known I have been in the habit of annexing any specimens which suggested a *plumose* tendency. The drought bore heavily on all ; they drooped and wilted, not however so badly as the *Athyriums* : and when the drought broke they revived ; so much so that no permanent injury is to be feared.

Of the *Scolopendriums* and *Lastrea Filix-Mas* it is not easy to speak in classes. The *Scolopendriums* were the more sensitive of the two ; only a few refrained from asking for water ; all needed careful watching. *Lastrea F. M. acrocladon (grandiceps?)* of which I have a good stock, required help early, and was put on the regular watering list, but the other varieties were able to survive without any special attention.

Polypodium vulgare behaved peculiarly. As a rule many of the old fronds remain until the young growth

commences. This year the old fronds dropped off wholesale, and left the creeping rhizomes bare. Had I known less of *Polypodiums* I might have been anxious. I remembered however the dry summer of 1911, and how well *P. vulgare* bore that drought.* Nor have I been disappointed. When I left home for a month at the beginning of August only a few of the *Polypodiums* were moving ; many showed no signs of growth. Now, September, they are better than ever before ; not a single plant has failed to send up a stock of exceptionally luxuriant fronds. I think we may take it as proved that *Polypodium vulgare* is actually benefited by a dry season. [In Ireland perhaps so.—ED.]

I notice last the shield ferns, *Polystichum angulare*. They in their *plumose* form make the largest part of my collection. With the solitary exception of a few specimens of *P. a rarefactum*, none of them complained.

The growth is perhaps not quite so luxuriant as usual, and there was, in some cases, noticeably in *P.a. plumosum*, Esplan, a tardiness in development. Otherwise my stock is untouched by the drought. The *plumosums* have shown a splendid capacity for not only existing, but for flourishing through waterless months.

Doubtless these happy results are largely due to influences more or less within the reach of every fern cultivator, viz., careful planting, in suitable places and suitable aspects. My ferns get little sun, some get none ; they are all in sheltered positions ; most of them have northern or north-eastern aspects. Thus fortified the collection as a whole has been able to pass safely through the drought of 1921 unassisted by the water-can.

H. KINGSMILL MOORE.

* See my note Vol. I., No. 10, pp. 237-238.

THE DROUGHT OF 1921 IN READING.

The present season has probably been the most trying for fern growers since 1893. A mild winter was followed by a cold, dry spring and this was immediately succeeded by a dry and parching summer. The drought seems to have been pretty general over the whole of Great Britain, and even in the usually green and moist country of Ireland, but, so far as we can gather, no district has been quite so dried up as that of Reading, where we have only had two moderate rains, scarcely more than showers, on May 10th and August 17th respectively. Both of these were immediately followed by periods of scorching sunshine and drying winds, which quickly licked up every particle of moisture from the soil. Even now (September) the soil is dust dry for two or three feet deep, except where it has been watered—mulching and hoeing were alike useless, and it has been necessary to water copiously and regularly to keep things alive at all. Fortunately our River Kennett has continued to supply us with a sufficiency of water for household purposes. This water, however, is impregnated strongly with carbonate of lime, so that for such things as *Blechnums*, *L. montana* and *L. dilatata*, it has been necessary to get rid of the lime by chemical means (*i.e.*, ammonium oxalate, which forms an insoluble oxalate of lime when mixed with the water). The precipitate is allowed to settle and the resulting clear upper fluid is practically as soft as rain water. In this way *montanas* and *Blechnums* have been kept alive and have not suffered appreciably—have, in fact, done remarkably well—inasmuch as they were all grown in pots which have been kept standing in pans of water, and these have been replenished at least once, and in the hottest weather, sometimes two or three times, a day. The pots are now crowded with masses of

healthy roots, and the *montanas* have made splendid crowns for next year. All of them will require to be pulled to pieces, or to have larger pots, in the spring. *Blechnums* have not done quite so well, but all have done at least fairly, and not one has died. *Polystichums* and *Scolopendriums*, etc., whether in the open ground or planted in frames, have been liberally watered at least once a week, the hose being laid on and the water allowed to run for half an hour or so to each large plant. The labour involved has been Herculean, and such treatment is, of course, only possible in a comparatively small garden. Deeply rooting fruit trees have not been watered, but such things as roses and pæonies have, although less frequently than the ferns. Notwithstanding this some of them have died. Bearded irises have held their own well but have made but little growth, although they are mostly natives of hot sunny climates and are supposed to enjoy a baking summer. *Polypodies*, in frames, have done very well (but not without watering) and are now a glorious sight, several kinds having fronds nearly two feet in length and proportionate in width, not drawn up but firm and stocky in character.

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F. W. STANSFIELD, M.D.

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*(Hon. Sec. and Hon. Treasurer, Mr. Charles Henwood, 21, Clifton Road,
Maida Vale, London, W. 9.)*

KENDAL, WESTMORLAND.

THE BRITISH FERN GAZETTE.

NEW SERIES.

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EDITORIAL NOTES.

The Editor wishes the members, individually and collectively, a Happy Christmas and a Prosperous New Year. We trust that members will work whole-heartedly to extend the influence and increase the prosperity of the Society. They can do this first by endeavouring to obtain new members and perhaps still more by giving to the Society, through the medium of the GAZETTE, the benefit of their experience and knowledge on Fern subjects.

We have received from Mr. F. T. McFarland, Department of Botany, University of Kentucky, Lexington, U.S.A., an inquiry for all the back numbers of the GAZETTE and also for Mr. Druery's two books on ferns. We believe "Choice British Ferns," published by the Society, is now out of print, and Mr. McFarland will be glad to hear from any member possessing a spare copy.

The present number contains an article on the Nomenclature of British Ferns, for which we have to

thank the eminent systematic botanist, Dr. G. C. Druce, of Oxford. It is obvious that a common system of nomenclature is of the first importance in any branch of natural science, and that it is worth while for nations and sections to make whatever sacrifices of private convenience and prejudice may be necessary to attain this end. If it can be shown that a general and stable agreement has been reached we are certain that our Society will gladly conform to the new system. We should like, however, to have some evidence that the "new world peace" will be a final one. If not, it will only serve to increase the already existing confusion. Beyond saying that Dr. Druce has purposely excluded varieties from his list, we postpone further comment upon it.

The Hon. Secretary and Hon. Treasurer, Mr. C. Henwood, will be obliged if members will remit any due or overdue subscriptions to him as promptly as possible. He will also be glad to send a specimen copy of the GAZETTE to any outside person who may be indicated as a possible member.

We publish herewith the Society's Balance Sheet for the past year.

THE NOMENCLATURE OF BRITISH FERNS.

G. CLARIDGE DRUCE, LL.D., &C.

With Ferns as with Flowering Plants the cardinal principle in selecting the official name is "priority of publication," which means that a botanist who first names and describes a species is entitled to be quoted as the authority for it, and the name selected by him has priority over other names which may be subsequently used. If, however, the genus in which he places it is found to be wrong—that is if its characters belong to a different genus

or if a new genus has to be found for it, his trivial must stand even if another generic name is used, and the authority for the new binomial has his name appended, although many botanists prefer to include the authority for the original name in brackets : for instance, Linnæus described the Lady Fern as a *Polypodium*, and the name was then written *Polypodium Filix-fœmina* L. Subsequently Roth showed that it was essentially different from a *Polypodium*, and, retaining the Linnean specific name or trivial, we write *Athyrium Filix-fœmina* (L.) Roth. There have been most discordant views, not only as to the limitations but to the names of Fern genera, hence the many and kaleidoscopic changes of names, which are irritating to the botanist and most perplexing to the Fern lover. Fortunately, field botanists, in conversation, do not often use the binomial, but are content with the specific name ; so they speak of *Filix-mas* as the name for the Male Fern and do not much trouble whether it is linked with *Lastrea*, *Aspidium*, *Nephrodium* or *Dryopteris*. *Filix-mas* conveys the sense of what they mean. It is different in writing of Ferns, then the binomial must be employed. But which (?) is the question. Take for instance *Filix-mas*. Linnæus called it a *Polypodium*, as he did many ferns ; indeed he had little conception of a Fern genus. In Britain many authors—including Moore and Lindley, in "Nature Printed Ferns," 1855 ; Lowe ("Our Native Ferns," 209, 1865) ; Babington ("Manual Brit. Botany," 1904) ; Syme ("English Botany") ; the "British Museum List of Seed Plants and Ferns," 1907 ; the "Lond. Cat." 1908—call it *Lastrea Filix-mas*, *Lastrea* being the genus established by Presl in 1836. Hooker ("Student's Flora," 1884), uses *Nephrodium*, the latter genus being described by Richard in Michaux "Fl. Bor. Amer." in 1803 ; Bentham and Hooker ("Ill. Brit.

Flora," 323), give *Aspidium*, which was defined in 1800. *Dryopteris*, which was established by Adanson, in the "Familles des Plantes," in 1763, was first used in Britain by Newman, in his "British Ferns," and *Dryopteris*, being the oldest name, was chosen by me for the Male Fern in the "Flora of Berkshire" in 1897, and in my "List of British Plants," in 1907, as it is also in the "American Check List." Before explaining further I may say that among continental authors, Rouy and Foucaud ("Flore de France"); Archangeli ("Fl. Italiana"); Cosson and Germain ("Fl. Env. Paris," 1845), use *Nephrodium*; The Abbé Coste ("Flore de France"); and Roth ("Tent. Fl. Germ."); Ball ("Fl. Marocc. Spic."); Grenier and Godron ("Fl. du Fr."); Boreau ("Fl. du Centre France"), use *Polystichum*. Swartz ("Schrads. Journ." 1800); Nyman ("Consp. Fl. Eur."); Sibth. and Sm. ("Comp. Fl. Graec."); Gremli ("Swiss Flora," 1886), use *Aspidium*.

In 1906 Carl Christensen published his important and authoritative "Index Filicum," in the preparation of which Dr. Christ, of Basle, had rendered great assistance. The large herbarium which represents it is now in the possession of the great Fern Specialist Prince Roland Bonaparte, in Paris, and His Highness also uses the name *Dryopteris* for the genus containing the Male Fern. At the Botanical Congress at Brussels, Christensen's "Index" was considered to be an authoritative work. I may say that his sequence of genera in the Filices differs greatly from that in Nyman's "Conspectus," or in the "British List," but it is here appended so that Pteridologists may see at a glance generic names and the sequence given in the "Index."

Fam. 1 HYMENOPHYLLACEAE.

Gen. 1 *Trichomanes* L.

2 *Hymenophyllum* Sm.

Fam. 2 POLYPODIACEAE.

- Gen. 3 *Woodsia* Br.
 4 *Cystopteris* Bernh.
 5 *Onoclea* L.
 6 *Dryopteris* Adans. [*Lastrea*, *Nephrodium*,
 7 *Polystichum* Roth. etc.].
 8 *Athyrium* Roth.
 9 *Phyllitis* Hill [*Scolopendrium*].
 10 *Asplenium* L.
 11 *Ceterach* Adans.
 12 *Blechnum* L.
 13 *Anogramma* Link [*Gymnogramma*].
 14 *Cryptogramma* Br.
 15 *Adiantum* L.
 16 *Pteridium* Gled. Scop. [*Pteris* L. p.p.].
 17 *Polypodium* L.

Fam. 3 OSMUNDACEAE.

- Gen. 18 *Osmunda* L.

Fam. 4 OPHIOGLOSSACEAE.

- Gen. 21 *Ophioglossum* L.
 22 *Botrychium* Swartz.

From this list, in* which the synonyms are in brackets, it will be seen that the adoption of the names used by Christensen causes few alterations; most of them are in universal use; the chief change is that of *Dryopteris* instead of *Lastrea* and *Nephrodium*, and also the merging into this genus the *Phegopteris* of Fee (Groves in Babington's "Manual" put it under *Polypodium*); then there is the change of *Gymnogramma* for the Jersey Fern to *Anogramma*, which is necessitated by botanical reasons, as strictly speaking the Jersey Fern is not *Gymnogramma*; the replacement of the genus *Scolopendrium* by the much earlier one of *Phyllitis* has been already adopted in our List and in

Groves' edition of Babington. The last change is that of *Pteridium* for *Pteris*, so no serious heart-burnings can arise among British botanists, and a great advantage will be secured that in using these names we shall be in accord with the botanists of the whole world.

Below is appended the List of British Ferns as they appeared in my Plant List. A few necessary alterations in this have been made.

PTERIDOPHYTA.

104. POLYPODIACEAE.

Br. Prod. i. 145 (1810).

- 707 CRYPTOGRAMMA Br. in Franklin's Voy. 767 (1823).
2875 *crispa* Br. 54 [6]. H 6.
- 708 PTERIDIUM Gleditsch ex Scopoli Fe. Carn. 169, 1760.
(*Pteris* L. pp.)
2876 *Aquilinum* Kuhn 112. H 40. S.
- 709 ADIANTUM L. Sp. Pl.
2877 *Capillus-Veneris* L. 10 [2]. H 6. Jersey.
- 710 BLECHNUM L. Gen. 455 (1754).
2878 *Spicant* With. 112. H 39. S.
(*Lomaria Spicant* Desv.)
- 711 PHYLLITIS Hill, Brit. Herb. 525 (1756).
2879 *Scolopendrium* Newman. 107. H 40. S.
(*Scolopendrium vulgare* Symons.)
- 712 ASPLENIUM L. Sp. Pl.
2880 *marinum* L. 55. H 20. S.
2881 *Trichomanes* L. 111. H 40. S.
[× *Ruta-muraria* = *Clermontae* Syme. Hib.]
2882 *viride* Huds. 47 [12]. H 12.
2883 *lanceolatum* Huds. Ang. 13 [6]. H 3. S.
2884 *fontanum* Bernh. Eur.

- 2885 *Adiantum-nigrum* L. 109. H 40. S.
 2886 *Ruta-muraria* L. 111. H 40. S.
 2887 *germanicum* Weiss. 12 [2].
 2888 *septentrionale* G.F. Hoffm. 15 [4].
- 713 **ATHYRIUM** Roth. Tent. Fl. Germ. iii. 355 (1800).
 2889 *Filix-fœmina* Roth. 110. H 40. S.
 2890 *alpestre* Milde. Scot. 13 [4].
 (A. *rhæticum* Dalla Torre = *Polypod. molle* R. &
 B. = *Aspidium alp.* Hoppe.)
 2891 *flexile* Syme. Scot. 6.
 (*Polypodium flexile* Moore.)
- 714 **POLYSTICHUM** Roth. l. c. 69 (1800).
 (*Aspidium* Swartz.)
 2892 *setiferum* Woynar. 73. H 40. S.
 (*angulare* Presl.)
 2892(2) *Braunii* Spenn. Som. ?
 2893 *lobatum* Huds. 103. H 37.
 (*aculeatum* Roth.)
 b. *lobatum* Presl.
 2894 *Lonchitis* Roth. 26 [5]. H 6.
- 715 **ONOCLEA** L. Sp. Pl.
 2895 *sensibilis* L. Am. bor.
- 716 **DRYOPTERIS** Adans. Fam. ii. 20 (1763).
 (*Lastrea* Presl = *Nephrodium* Rich. *Aspidium*
 Sw. p. p.)
 2896 *Filix-mas* Schott. 112. H 40. S.
 c. *paleacea* (Don) Druce. (*Borreri* Newm.)
 e. *abbreviata* (Lam.).
 × *spinulosa* = *remota* A. Braun. Winder-
 mere, Lomond.
 2897 *cristata* L. A. Gray. Ang. 11 [8].
 × *spinulosa* = ? *uliginosa* Kuntze. Ang. 7.
 [5].

- 2898 *spinulosa* Kuntze. 92 [5]. H 34.
 e. *glandulosa* Milde.
 (? *spinulosa* $\times$ *aristata*.)
- 2899 *aristata* (Vill.). 111. H 40. S.
 (*L. dilatata* Presl = *Asp. dilatatum* Swartz.)
 e. *alpina* (Moore).
- 2900 *aemula* Kuntze. 35 [17]. H 37.
 (*Last. recurva* Newm. = *Neph. fæniseeii* Lowe.)
- 2901 *Villarsii* (Bell.) Woyn. Ang. 7 [1].
 (*rigida* Underw.)
- 2902 *Oreopteris* Maxim. 104 [3]. H 30.
 (*montana* Kuntze. *Lastrea* O. Presl.)
- 2903 *Thelypteris* A. Gray. 43 [4]. H 14.
 (*Sect. Phegopteris* Fée.)
- 2904 *Phegopteris* Christ. 82. H 20.
 (*Poly. Phegopt. L.* = *Pheg. polypoides* Fée.)
- 2905 *Linnæana* Christ. 82. H 4.
 (*Pheg. Dryopteris* Fée.)
- 2906 *Robertiana* Christ. 29 [7].
 (*Pol. calcareum* Sm. = *Pheg. Robertiana* Fée.)
- 717 CYSTOPTERIS Bernh. in Schrad. Journ. i. 26 (1806).
 2907 *montana* Desv. Brit. bor. 8.
 2908 *regia* Presl. ? 2.
 2908(2) *Dickieana* Sim., Kincardine.
 2909 *fragilis* Bernh. 85. H 32.
- 718 POLYPODIUM [Tourn.] L. Sp. Pl.
 2910 *vulgare* L. 112. H 40. S.
- 720 CETERACH Adans. Fam. ii. 20 (1763) p. p.
 2911 *officinarum* Lam. & DC. 69 [4]. H 40. S.
 (*Asplenium*.)
- 721 ANOGRAMMA Link Fil. Sp. 137 (1841).
 (*Gymnogramma* Desv.).
 2912 *leptophylla* Desv. Sarnia.

722 WOODSIA Br. in Tr. Linn. Soc. xi. 173 (1813).

2913 *ilvensis* Br. 9 [2].

2914 *alpina* S. F. Gray. 6. (*hyperborea* Br.).

105. HYMENOPHYLLACEAE.

Gaud. in Freyc. Voy. Bot. 262 (1826.)

723 TRICHOMANES L. Sp. Pl.

2915 *radicans* Sw. 2 [8]. H 12 [1].

724 HYMENOPHYLLUM Sm. E. B. i. 162 (1794).

2916 *tunbrigense* (L.) Sm. 30[11]. H 24.

2917 *peltatum* Desv. 52. H 29.

(*H. unilaterale* Bor. = *H. Wilsoni* Hook.)

106. OSMUNDACEAE.

Br. Prod. i. 161 (1810).

725 OSMUNDA [Tourn.] L. Sp. Pl.

2918 *regalis* L. 91. H 38 [1]. S.

107. OPHIOGLOSSACEAE.

Br. Prod. i. 163 (1810).

726 BOTRYCHIUM Sw. in Schrad. Journ. ii. 110 (1800).

2919 *Lunaria* Sw. 104. H 35. Guernsey.

727 OPHIOGLOSSUM [Tourn.] L. Sp. Pl.

2920 *vulgatum* L. 100. H 35. S.

2921 *lusitanicum* L. Guerns. ; Aldern.

It is quite probable when a new edition of the British Plant List is issued that I shall adopt the sequence of the Christensen Index, but in the above I have only (against my own judgment) merged *Phegopteris* into *Dryopteris*, and made a few alterations in the specific names which have been in the main taken from the suggestions of the distinguished Austrian Pteridologist, H. Woynar, these being the substitution of *Polystichum setiferum* for *P. angulare*, *P. lobatum* for *P. aculeatum*, of *Dryopteris Villarsii* for the well known *D. rigida* of the limestone area of Northern

England, and the restoration of *D. Oreopteris* for the less well known *D. montana* : in all these instances the older trivial is used.

Just a word about the abbreviations employed above : most speak for themselves. The generic and specific numbers are those of the Plant List. The numbers following the specific name refer to the distribution of the plant in the British Isles so far as is ascertained. Britain is divided into 112 vice-counties ; therefore "99" means that it has been recorded for 99 of such vice-counties. I ought to have said that 59 of the 112 are English, 12 Welsh and 41 Scottish. When a plant only occurs in Scotland then Scot. is appended, if in England only then "Ang." is appended. "H" signifies Hibernia, which has 40 vice-counties. "S" = Sarnia, signifies the Channel Isles, if in one only of the group that island is mentioned.

As regards the varieties of Ferns which are included in my list, I must confess my own want of knowledge as to their distinctness as true varieties. Those given are, I am afraid, arbitrary, and on this I should much value the opinion of the readers of this Magazine who can give me most valued aid.

THE PURPOSE OF VARIATION IN FERNS.

The phenomenon of variation, although existing all through animated nature, has probably been more noticed among the British Ferns than in any other group of species. The hunt for wild varieties, which has now been kept up for 70 years or more, has resulted in the collecting of a definite series of facts. The first is that almost every species has been found to vary more or less, although, of course, the greatest number of variations have been recorded in these species which are most abundant and in

those which lend themselves most to decorative purposes. The only British species in which no varieties have been recorded are : *Cystopteris montana*, *Asplenium septentrionale*, *Polypodium calcareum*, *Gymnogramma leptophylla*, *Woodsia Ilvensis* and *W. alpina* and *Ophioglossum Lusitanicum*. With the exception of the Limestone Polypody, these are all rare plants, each of which is a "find" in itself, apart from the question of varieties. *P. calcareum*, although locally abundant, is not a widely distributed fern, and it is doubtful whether any fern-fancier has ever made a systematic search for varieties. The writer has himself, during the present year, casually detected a slight tendency to forking of the tips in this species, although this was not sufficiently definite to constitute a fixed variety. This forking of tips, or the multiplication of other parts, is probably the commonest type of variation, and is generally the first thing noticed by a beginner in fern-hunting. Among those species in which variation is most marked, however, it is found that every part of the plant is liable to variation. In addition to changes in the form, texture, cutting, and colour of the fronds, alterations are to be found in the stems, crowns, rhizomes, sori, indusia, scales, and even in the roots. There are also changes in the microscopic anatomy of the cells, although this is of course only to be found by the skilled cytologist, and is beyond the reach of the ordinary fern-fancier. Another curious fact is that alterations in one part of the plant are frequently associated with changes in another. In the acuti-divisilobe section of *P. angulare*, for instance, the production of numerous bulbils or buds upon the rachis and stipes is so frequent as to be almost the rule—indeed, as our readers know, the earlier discovered acutilobes and divisilobes were first named "*proliferum*," as if this were the main character.

The height of absurdity was reached when an acutilobe in *aculeatum* was found and was also named *proliferum*, although no adventitious buds were found upon it. This led, naturally, to the dropping of the word *proliferum* as a primary varietal name, although it is still used as a secondary name to varieties which are specially given to the bearing of bulbils. There is, however, scarcely any variety of *angulare* which will not *occasionally* produce a bulbil or two, but there are now many divisilobes and acutilobes which only do it occasionally and not regularly (*e.g.*, one bulbil may be seen in half a dozen years or so). Another peculiarity of the acutilobe and divisilobe section is the abundance of scales which clothe the stipes and rachis. These scales are generally silvery white in the young state, but become reddish or "foxy" when the fronds are fully matured. The late Mr. E. F. Fox noted that these foxy scales had a peculiar cedar-like smell in this section of ferns. Again the plumose character, in almost every species, is associated with abnormality of the sori, which may be absent or relatively scarce, or may be destitute of indusia or even occasionally changed into bulbils as sometimes seen in the Axminster *plumosum* in *Athyrium* and in *Polypodium v. Cornubiense*. Another instance of correlation of characters is the combination of finely cut pinnules (although this is different from the cutting of the divisilobes) with brachiation in *P. angulare*. The writer recently noted (GAZETTE, Vol. III., p. 130) that the *angulare brachiatums*, so far as his observations go, have also naked sori. This fact has not, however, been either confirmed or contradicted by other workers and further observations are desirable.

There is a certain parallelism in the range and direction of variation among the various species. Thus we get

cresting or multiplication of tips in almost every species which varies at all, the only exceptions being *Hymenophyllum Tunbridgense*, *Asplenium Germanicum*, *Lastrea cristata*, *Polypodium dryopteris*, *Botrychium lunaria*, and *Ophioglossum vulgatum*. Congestion and expansion of the lamina are also pretty generally found among the various species although, naturally, the more divided kinds show it more easily than the simpler ones. In *Scolopendrium*, congestion is represented by such forms as *spirale* and *crispissimum*. The plumose character is found more or less perfectly developed in *Adiantum*, *Asplenium trichomanes*, *A. marinum*, *Athyrium*, *Blechnum*, *Scolopendrium* (the crispums), *P. angulare* and *aculeatum*, *Lastrea montana*, *L. filix-mas*, *Polypodium vulgare* and *P. dryopteris*. In every one of these species, except *Blechnum spicant* and *P. dryopteris*, the plumose character is associated with total or partial sterility or some abnormality of the fructification. The *pulcherrimum* or ultra plumose character, which is considered to be the highest flight of genius among ferns, has hitherto only been found wild in *P. angulare* and *P. aculeatum*, *Scolopendrium vulgare* (*crispum fimbriatum*) and *Athyrium f. fœmina* (*Clarissima*), although it has been developed under cultivation in *Lastrea paleacea* (*apospora cristata*). It is, in every case, associated with apospory, and generally with non-production of spores.

It is seen, then, that there is a method in this madness. Variations do not occur merely haphazard and accidentally, but along definite lines and under certain laws. The question now to be discussed is WHY do ferns make these bold, sometimes almost frantic, experiments in the way of variation? It is clear that the normal form is the one which has been found, by long experience, to pay best in the ordinary conditions of the struggle for existence.

Whatever view we may take on the general question of Plan in the Universe, and especially in animated Nature, we may fairly assume that, if there be any purpose in Nature, then those variations which have been found to serve certain ends have actually had those ends as their purpose. For instance, ferns which have developed a thick clothing of scales upon their lower footstalks, have done so for the purpose of protecting the unfolding tender fronds from sudden frosts, &c. Ceterach has developed a habit of curling in its fronds in drought in order that the naked upper surface may be protected from evaporation, and the scales upon the lower surface have been produced in order to protect that surface from excessive evaporation. Similarly, the orchid *Angræcum sesquipedale* has developed its eleven-inch long nectary in order that it may be fertilized by a certain moth which has a proboscis of the same length. Also the head of the tape-worm is furnished with hooks in order that it may hang on to the lining membrane of the human or other intestine, which it does most tenaciously. In fact the whole of animated Nature teems with adaptations of means to ends so elaborate and so accurate that we are forced to conclude that Nature has somehow contrived them for their special purposes. What purpose then do the various modifications in the forms of ferns, which it is our habit to note, fulfil in the economy of fern life? They obviously do not conduce to the prosperity of the plant in its wild state, inasmuch as the varieties are usually at a disadvantage—in some cases very serious—in the ordinary struggle for existence. They only conduce to the prosperity of the plant when they succeed in drawing the attention and pleasing the eye of another organism, to wit, the human fern-hunter. When they do this the fern in question benefits very materially, inasmuch as it is

immediately rescued from the remorseless conflict with wild nature and placed under much more favourable conditions in the fernery. It is protected from the aggression of stronger plants, from the slash-hook of the hedge cutter, from the attacks of hosts of vermin of various kinds, and, to a certain extent, from the vicissitudes of the weather. Thus variation is a kind of advertisement on the part of individual plants and, like advertisements in "The Times," &c., it has to be paid for. Some kinds of advertisement are relatively cheap, viz., those which involve little, if any, diminution of fertility or vegetative vigour, such as the minor forms of cresting, the acutilobe character in *Polystichums*, the marginate and supralineate characters in *Scolopendrium* and the *semilacerum* character in the *Polypody*. When complete sterility is reached, however, as in the *Polypodium Cambricum* and *Scolopendrium v. crispum* sections and the more highly developed *plumosums* in other species, it is evident that the plant is paying a heavy price for its "full-page" advertisement, inasmuch as it is no longer able to disseminate its spores and can only hope to survive by being rescued at the hands of the fern-hunter. When we come to the highest efforts of genius as in the *pulcherrimums*, which are rendered not only sterile to spore propagation but are otherwise at a serious disadvantage from their generally weakened constitutions, it is obvious that the plant is literally staking its existence upon the chance of rescue. It is the most desperate kind of gambling known in Nature, and it is not surprising that so few individuals have the courage to pay the price. Some of these *pulcherrimums* protect themselves, like the bookmakers at races, by "hedging," i.e., they send up only a proportion of characteristic fronds among a varying number of normal ones. In this way they

calculate to make the best of both worlds, to "run with the hare and hunt with the hounds," for, while the *pulcherrimum* fronds are a signal to the fern-hunter, the normal ones are a means of keeping up something like the normal vigour and fertility. It is a kind of half-page advertisement which costs less than the full-page one and, in the event of no customer coming along, it can be withdrawn and the fern will relapse to the normal. Most of the *angulare pulcherrimums* which have been found wild have been of this kind, and doubtless many others which have not been found at all. Moly's green *pulcherrimum*, when found, and for many years afterwards, only produced some 30 to 40 per cent. of characteristic fronds, the rest being normal or nearly so. Under cultivation the fern, or rather a part of it, has advanced from an intermittent to a constant variety. On the other hand Padley's, Jackson's, Smith's and Mrs. Thompson's, all intermittent forms, have lapsed to the normal. Wills's has done still worse, for, although originally a constant form, it has also reverted to the normal. Like many other advertisers these have made more or less glowing promises which they have afterwards been unable or unwilling to fulfil. There is a good deal of human nature in ferns. Notwithstanding its risky character full-page advertising sometimes pays, its success or failure depending upon the taste and the skill and pertinacity of the fern-hunter and cultivator. Should these increase it may reasonably be expected that the enterprise of ferns will sooner or later rise to a proportionate extent. It is evident that fern-hunters and growers play an important part in the economy of Nature.

F.W.S.

A. F.F. UNCO-GLOMERATUM.

Some of the choicest gems of the fern world belong to the genus *Athyrium*, but the subject of these notes, in view of its gemmiferous character is probably the most epoch-making. It was raised in 1876 from the then little known but comparatively coarse *A. f.f. acrocladon* and soon began to exhibit that ultra-ramulose character combined with extreme tenuity of foliage which distinguishes it at the present time.

During the third year of its existence it was removed from the cool humid conditions of its birthplace (an ideal *Athyrium* district enjoying a heavy rainfall) to the arid conditions prevailing in one of the driest parts of mid-Yorkshire, where the rainfall is much below the average, and the winds are so fiercely evaporating that it is unusual for any *Athyrium* to survive more than two or three years under any circumstances. In spite of a world of loving care and every possible attention, the plant evidently felt the fatal drain upon its vitality, with its accompanying premonition of impending dissolution, and as is usually the case when much punished, made a bid for life by producing a crop of spores, but severe frost coming upon the heels of summer (1879) the spores were abortive and never matured. Fairly sound spores, which the writer has hopes of being able to germinate, have been produced this season on reverted fronds, the reversion being quite exceptional and probably due to the punishment inflicted by the prolonged drought.

The most striking peculiarity in connection with this fern and one which renders it absolutely unique among British ferns, is its ability to develop apical buds on fronds which have apparently completed their growth and which are (so far as can be seen) worked out to the terminal. It

often happens in very moist seasons that the fronds continue growing and unfurling without intermission the whole season through, and are never fully unfurled. In this condition the fern is at its best, as it continues to ramify during the whole period of its growth, consequently, towards the end of August the plant becomes one dense mass, composed of thousands of growing and still branching tips. In hot dry seasons growth of the early spring fronds apparently ceases, and the fronds appear to be complete, but a microscopic examination will reveal a very slight thickening of the terminal tissues. This thickening continues until buds are developed, when the old fronds are endowed with a new lease of life, and continue to develop, each single tip growing and ramifying until cut down by frost. As the terminal buds are constantly unfurling and extending, the earlier growth is covered by the gossamer mantle which is being constantly woven and extended from day to day, so that the plant is "with surpassing glory crowned," even when its plebeian sisters have fulfilled their destiny and are in the "sere and yellow leaf."

Fronds laid down for propagation twelve years ago have yielded a small annual crop ever since, although there is nothing visible to the naked eye in the shape of either old fronds or prothalloid growth, the surface of the dish being overrun with green slime (*Protococcus pluvialis*), which is considered such a nuisance when it gets a footing among newly-sown spores. The infinitely small threadlike growths, although invisible, must be able to exist in this medium because *ex nihilo nihil fit*, but a bed of living slime, although ensuring uniformly moist conditions, would appear to be anything but a suitable nidus in which to raise up a crop of seedlings of a fern so very frail and ethereal.

For 20 years after its birth the plant was propagated by

division, two offsets only being produced during this period. This was the only known method of propagation until its aposporous capability was so ably demonstrated by our Editor. It lends itself so well to aposporal development that it is now pretty generally distributed. Unlike many aposporous subjects, the seedlings so raised include quite a high percentage of true plants. Some are in the writer's opinion much more hair-like than the original, and stand in the same relation to the original, as does *P. acul. gracillimum* to its parent *pulcherrimum*. This is most noticeable when grown under specially favourable conditions from earliest infancy, when the growth assumes an extremely filiferous character. To ensure this condition the plant must have plenty of light and also something approaching close culture during the earlier period of its growth. The writer has had a small plant under close culture during the whole of this season, and a more beautiful object it would be difficult to imagine. Close culture would perhaps be inadvisable North of the Tweed, or in the Lake District, or with large plants anywhere, and the cultivator must be prepared to give attention four or five times daily to partial ventilation. If this is not attended to the fronds cannot support their own weight, a certain indication of too much shade or too close confinement. The writer stands his plants in half an inch of water during the day, removing them in the evening so as to allow the roots to breathe. Many of the roots would be destroyed by continuous immersion. This treatment appears to answer very well in this part of the country and the plants attain a maximum of capilliform development.

H. STANSFIELD.

A FERNY DELL.

A ferny dell beside the stream,
 Oh ! listen, and I'll tell ;
 'Tis hidden from the noonday beam ;
 A ferny dell :
 Meseems I know it well,
 And how its dainty fronds will gleam
 Where orbéd dewdrops fell.
 That nook refreshment will, I deem,
 For jaded mortal spell ;
 It is a talisman supreme,
 A ferny dell.

FRAS W. THORRINGTON.
 12th Nov., 1921.

ON SOWING SPORES.

Having been asked by several members to describe my method of raising ferns from spores I do so, although with some diffidence, as the subject has already been dealt with by the late Mr. Druery and by Mr. Alexander Cowan. There are many ways of raising ferns from spores, all of which have been successful in the hands of experts, and naturally each successful raiser considers his method the best. Probably for him it is the best, but it is not necessarily the best for every one, and each worker may select the one which appeals to him. All the methods rest on certain broad principles.

- (i) The maintenance of a continuously moist atmosphere.
- (ii) Adequate, but not excessive, moisture of the soil.
- (iii) The exclusion of worms, weeds, and extraneous spores.

The last of these is by far the most difficult of attainment, indeed it is not too much to say that it is impossible to realise it completely, inasmuch as, however thoroughly we may sterilize the soil and the water, we cannot sterilize the spores; *i.e.*, we cannot be sure that we do not sow, along with them, the spores of confervæ, mosses, moulds and *Protococci*. The chances of intrusion can, however, be reduced to a minimum by careful gathering of the spores, *i.e.*, by taking a pinna or pinnule of the selected fern as soon as the sori are ripe and allowing the spores to be shed naturally upon a piece of perfectly clean glazed paper, carefully folded to exclude the air and dust. The clean spores being obtained, the sooner they are sown the better for, although it is well known that some spores can be kept for many years without losing their vitality, there can be no doubt that this is highest when the spores are first shed from their capsules. It is Nature's selected time for sowing, and self-sown spores, provided they meet with favourable conditions, germinate the most rapidly and vigorously. We come now to the question of receptacles for the spore bed and spores. There is no question that spores can be successfully sown in ordinary pots, covered with bell-glasses or merely with flat pieces of glass, the pots being stood in saucers and supplied with water as required from below. In this way, however, they require to be carefully watched, and the supply of water must be so regulated that the soil never becomes either too dry or too wet. After long experience I have found circular glass butter-dishes with closely fitting glass lids to be the most convenient and least troublesome of "spore pots." The less ornamentation there is about these dishes, and especially about the lids, the better for the ferns. Patterns and decorations upon the lids not only obscure the view but

keep out the light, and are also an element of needless cost. It is not always easy, however, to obtain perfectly plain lids. The dishes being washed clean and wiped dry with a clean cloth the next consideration is the soil. It is well known that ferns vary very much in their choice of soils, some liking peat, others loam or leaf-mould, some preferring and some abhorring a calcareous bed. There are, however, few ferns the spores of which will not germinate and the prothalli perform their functions upon a stratum of stiff loam. This may even approach the character of clay, and we have often seen small seedlings of *Blechnum*, *L. dilatata*, *L. montana*, and *Athyrium* growing upon a surface of pure clay. Clay is not, however, to be selected for spore pots but a stiff, preferably non-fibrous loam, will answer for most ferns. Of course for lime-hating ferns it should be free from lime. The soil is mixed with water in a pan and boiled for some time until soil and water become mud of the consistency of thick porridge. Some of this is ladled out with a spoon, while still hot, but not boiling, and placed in an irregular heap in the middle of the spore dish. The mound is made an inch or an inch and a half high in the centre and slopes down around the circumference, almost to the bottom of the basin. The lid is immediately placed upon the dish, covering in the hot mud, and the dish is put aside for a few days to cool and settle. In this time the superfluous water drains from the mud and settles in the groove around the base of the mound from which situation it can be readily poured out without disturbing the soil. As soon as it ceases to drain, the spores are sown thinly upon the irregular mound of moist earth. If sown too early, *i.e.*, while the mound is still oozing, the spores will be carried down by the trickling water and lost in the ditch. As soon as the spores are sown the lid is put in place

and is not again raised, without some particular reason, until the ferns are ready to prick off. The name of the variety sown is written in indelible ink, with the date of sowing, upon a celluloid label, which is tied round the knob of the lid with copper wire, and so a record is kept which will last for years without being obliterated. The spore dishes are then put in a place where there is plenty of daylight, but no sunshine (I prefer the inside sill of a house window, facing North), and after this they will require very little attention until the young ferns are ready to prick off, which may be in a couple of months, or may extend to half a dozen years or even longer. *Pteris aquilina* and *Athyrium* germinate and develop very quickly, but *Polypodies* are very slow. *Scolopendriums*, *Lastreas*, *Polystichums*, &c., are intermediate. The process of germination and development can be watched through the glass, and water may require to be supplied occasionally, although as there is very little evaporation and no leakage of water this is at longish intervals. When it is desired to lift the lid of the dish for any purpose, this should be done, as far as possible, in a room away from growing ferns and in a still and dustless atmosphere. The lid should not be removed more frequently than is absolutely necessary as every opening gives an opportunity for the entry of floating spores and germs. If the dishes can be kept in a warm house or room a good deal of time is saved as the prothalli develop more quickly and there are obviously fewer chances for the intrusion of undesirable spores. As soon as the prothalli are fully grown, should no young fronds appear, a little tepid water may be poured into the groove around the base of the mound, whence it will be quickly absorbed into the soil and any excess can be easily poured away without disturbing the soil or prothalli. The water for this purpose

should be kept at hand in a stoppered bottle. Filtered and boiled rain-water is best, although ordinary tap water will serve the purpose for many ferns. Ordinary rain water contains the spores of mosses and the germs of *Protococcus pluvialis*, the low organism which forms the green slime upon the surface of pots, &c., and which tends to block up the pores of the soil, thus rendering it unhealthy for young ferns. Perhaps the commonest cause of failure in sowing spores is sowing too thickly, the spores being so minute that it is difficult for the beginner to realise how many he is sowing. The spores produced from *one pinnule* of an *Athyrium* or *Polystichum* or from a pinna of an *Asplenium*, if taken at the right time, will be sufficient for one sowing. Should the prothalli be seen to be obviously crowded before they are fully grown it will be wise to prick out a number of them into another pot or dish in little groups of three or four, about a quarter of an inch apart, using sterilized soil. As soon as the little ferns have made one frond they should be carefully pricked out with the attached prothallus (vide Druery, GAZETTE, Vol. I., p. 135) and planted out, singly if possible, half an inch to three-quarters of an inch apart, according to the vigour of the kind. They will come on much more quickly and will make more symmetrical plants than if planted in bunches. No doubt many will say "I can raise seedlings without all that fuss," and this is doubtless true. With good luck and a warm moist house a good average of success may be reached by haphazard methods, but there will be sure to be some failures, and these may be just the ones most desired to be successful. "What I have written I have written," and no one need adopt my methods unless he chooses.

F.W.S.

VOL. 4.



No. 12.

= The =

British Fern Gazette.

September, 1922.

EDITED BY

F. W. STANSFIELD, M.D.

(READING)

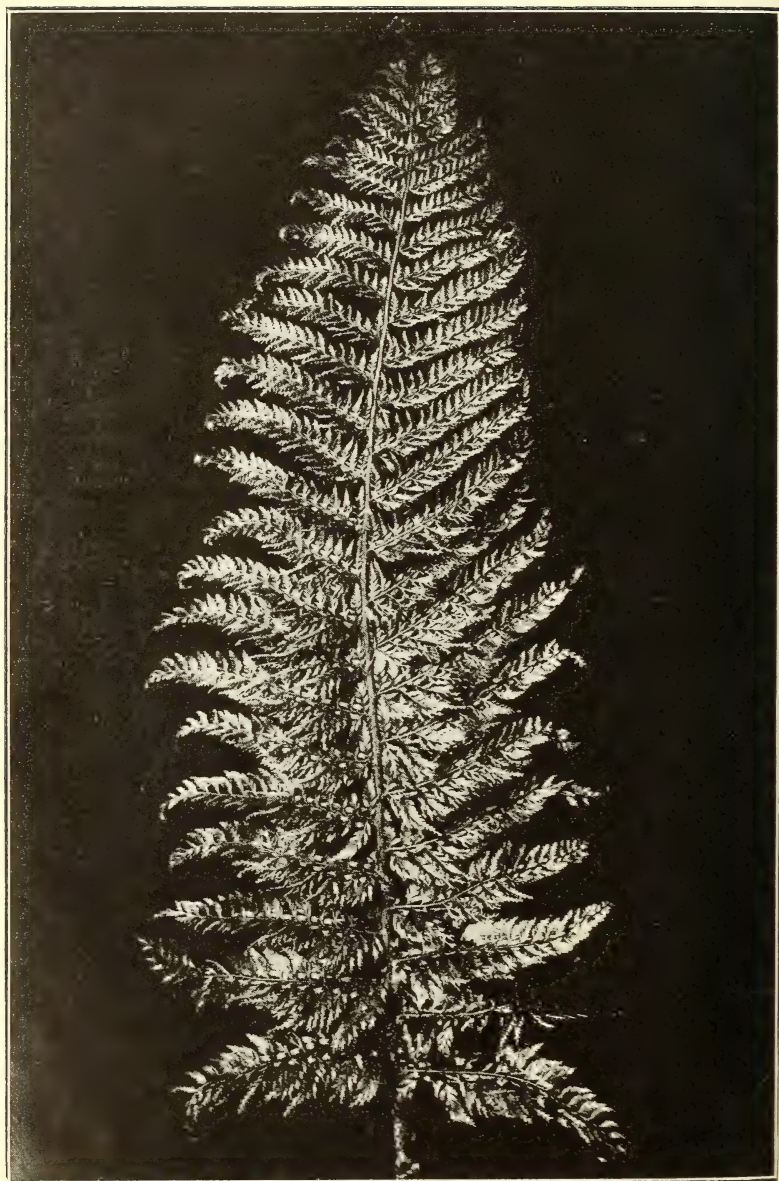
PUBLISHED BY

THE BRITISH PTERIDOLOGICAL SOCIETY

(President: Mr. W. B. Cranfield, East Lodge, Enfield Chase, Middlesex.)

(Hon. Secretary and Hon. Treasurer: Mr. Charles Henwood, 21, Clifton Road, Maida Vale, London, W.9.)

KENDAL, WESTMORLAND.



POLYSTICHUM ANG. PULCHERRIMUM—F.W.S.

[Scale $\frac{1}{8}$ rd.]



W. B. CRANFIELD, F.R.H.S., President, British Pteridological Society.

THE BRITISH FERN GAZETTE.

NEW SERIES.

Vol. 4.

SEPTEMBER, 1922.

No. 12.

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EDITORIAL NOTES.

The Editor congratulates the Society upon the completion of another Volume of the *Gazette* and has pleasure in presenting a portrait of the President for binding, as a frontispiece. This Volume has had the most chequered life of any yet issued, the numbers having had to be abbreviated and shorn of the frontispiece, which was formerly a conspicuous feature, as well as having their publication suspended for lack of funds. The Society has lost many of its members during the stormy and troublous times following upon the war. The faithful have, however, held together staunchly and the thanks of the Society generally are due to the little band of people who have kept the flag flying. The indefatigable Hon. Secretary, Mr. C. Henwood, has been a tower of strength and has contributed, in no small measure, to the life of the Society, both by his work in keeping his end up under difficult circumstances and by his generosity in paying postages and

other minor expenses out of his own pocket. The Rev. Canon Kingsmill Moore and Mr. H. Stansfield have also been especially helpful by their valuable contributions to our columns. There are signs that the *Gazette* is being more appreciated by the scientific world in general and inquiries for back numbers have come in from foreign universities as well as from the headquarters of British botany at Kew. A notable accession to the membership is the eminent French botanist, H.I.H. Prince Roland Bonaparte of Paris.

Finally, it is a matter of much satisfaction to the Executive that the Society is now thoroughly solvent, "owing no man anything," and having a useful balance to credit at the Bank. This comfortable state of affairs, however, is due to the enthusiasm and public spirit of a comparatively small number of members who cannot be expected to repeat indefinitely the process of levelling up. It is hoped that the members generally will endeavour to broaden the basis of the Society by missionary work among their friends who are non-members, as well as by regular and prompt payment of their own subscriptions. The subscriptions for the new year are now due and should be remitted to the Hon. Secretary and Treasurer, Mr. C. Henwood, 21, Clifton Road, Maida Vale, London, W.9.

Several articles are held over for a future number of the *Gazette*.

OUR FRONTISPIECE.

POLYSTICHUM ANGULARE PULCHERRIMUM—F.W.S.

This photograph was taken from the frond exhibited by Dr. Stansfield at the Llanberis Meeting, and for which he was awarded the Society's Certificate. The plant was raised from spores (supplied by Mr. T. E. Henwood) of *P. angulare divis. plumosum foliosum*, H. Stansfield, a very fine form of the Jones-Fox strain. The plant, which nearly died during the severe winter of 1916-17, is now in good health and has

produced, this year, some twenty fronds, all of which are thoroughly and uniformly pulcherrimum in character. The writer considers it the finest thing he has yet raised. The Society is indebted to Mr. Charles Henwood for the cost of this reproduction.

THE AUGUST MEETING.

The Annual Meeting of the Society was held at the Padarn Villa Hotel, Llanberis, on Monday, August 14th, the President, Mr. W. B. Cranfield, occupying the Chair. Members were also present from Co. Dublin, Manchester, Reading, South Woodford, Horsham (Sussex), and Brondesbury (London).

On the Balance Sheet being read, it was found that, although only two numbers of the *Gazette* had been issued during the year, the cost of one issue was still owing to the printers as compared with two numbers last year. It was elicited that the Hon. Secretary and Editor had both defrayed the cost of postages out of their own pockets, thereby saving the Society's funds to a considerable extent. A letter was read from Mr. Smithies, a Vice-President, regretting his inability to attend the Meeting and enclosing a contribution of £3 towards the funds of the Society. Other members present voluntarily added to this sum, as shown in the revised Balance Sheet published herewith, with the result that the Society was now found to have a balance in hand without encroaching upon the subscriptions for the new year.

The opinion was expressed that the cost of printing the *Gazette* was excessive for the work, and it was decided to try to find a cheaper printer. It was also resolved that the *Gazette* should be issued, for the present, only twice a year.

The officers were all re-elected, the name of Mr. G. E. Stephens (Horsham) being added to the Committee.

There was a lengthy discussion of the question of the revised nomenclature as presented by Dr. G. C. Druce in the December

issue of the *Gazette*. A general desire was expressed to conform to the usage of other botanists, but considerable doubt was expressed whether the settlement, supposed to be made by the Vienna Conference, would be a stable one, the new edition (1922) of Babington's *Manual of British Botany* being quoted as adhering to the more familiar names of Hooker, etc. It was eventually resolved that a Sub-Committee, consisting of the President and Dr. Stansfield, be appointed to confer with the Royal Horticultural Society and the Kew Authorities, to express the Society's views on nomenclature and to endeavour to come to an agreement with botanical authorities generally on the subject. The Sub-Committee was also empowered to represent the Society's views on the subject of certification of British fern varieties by the R.H.S.

There was some discussion as to the place of meeting for 1923, a desire for Ireland having been expressed and a long time having elapsed since that rich hunting-ground was visited. The advice of Canon Kingsmill Moore (subsequently confirmed by another Irish member) was that the West of Ireland was not likely to be a comfortable place for peaceful citizens to visit for another year at least. It was eventually resolved, on the motion of Mr. T. E. Henwood, that the Meeting next year should be in the neighbourhood of Axminster (Devon), where good hunting was certain to be met with.

Fronds of new and rare varieties were exhibited by the President, Mr. Edwards, Mr. Henwood, Mr. C. Henwood, Canon Kingsmill Moore and Dr. Stansfield, and the following Certificates were awarded :—

To Mr. Charles Henwood :—

for *Polypodium v. Cambricum*, Henwood, and for *Polypodium v. cristatum*, Henwood.

To Mr. J. W. Walton, Richmond :—

For *Polystichum angulare foliosum grande*, Walton, exhibited by Mr. T. E. Henwood.

To Mr. J. E. Austin, West Court, Detling, near Maidstone :—
 For *Polystichum angulare divisilobum*, Bland ; also exhibited
 by Mr. T. E. Henwood.

To Dr. Stansfield, Reading :—

For *Lastrea montana formosa-cristata*, F. W. Stansfield,
 and for *Polystichum angulare pulcherrimum*, F. W.
 Stansfield.

To Mr. George Whitwell, Kendal :—

For *Lastrea pseudo-mas polydactyla*, Whitwell.

To Mr. J. Edwards, Manchester :—

For *Polystichum aculeatum pulcherrimum foliosum*, Edwards,
 and for *Lastrea pseudo-mas fimbriata-cristata angustata*,
 Cropper.

To Rev. Canon Kingsmill Moore :—

For *Athyrium f.f. cruciato-cristatum baccatum*, K. Moore.

Mr. C. Henwood exhibited a frond of a fine crested form of
Lastrea Filix-mas, which he had found on the wall of Norwich
 Cathedral.

The members remained at Llanberis for practically a week,
 and the surrounding neighbourhood was energetically scoured
 for varieties. The following species were noted :—*Allosorus*
crispus, *Lastrea oreopteris* (*montana*), *L. Filix-mas*, *L. pseudo-*
mas, *L. propinqua*, *Athyrium Filix-fœmina*, *Polypodium*
vulgare, *Blechnum spicant*, all of which were abundant and
 widely distributed. Less abundant were *Lastrea spinulosa*,
Polypodium phegopteris, *Asplenium trichomanes*, *A. Adiantum-*
nigrum, *A. Ruta-muraria*, *Ceterach officinarum*. *Scolopen-*
drium vulgare was only found very occasionally in chinks of
 mortared walls and mostly as very small specimens. *Hymeno-*
phyllum unilaterale was found in two places only, near
 waterfalls. The *Lycopodiums*, *clavatum*, *alpinum* and *selago*
 were also noted. Many small variations were observed,
 but no variety worthy of being perpetuated or collected was
 found.

THE BRITISH PTERIDOLOGICAL SOCIETY.

BALANCE SHEET, 1922.

1922.		£	s.	d.	1922.		£	s.	d.
To	Balance at Bank from 1921	..	..	9 3 6	By	Paid Metcalfe & Cooper for March and June	..	..	25 9 8
..	Cash in Secretary's hands from 1921	..	..	4 3	..	<i>Gazettes</i> for 1921	..	..	..
..	Subscriptions	..	..	34 11 0	..	Paid Affiliation Fee to R.H.S.	..	..	2 2 0
..	Donations from :—	..	..	..	..	Paid Metcalfe & Cooper for September	..	..	..
..	Mr. W. B. Cranfield	..	..	3 0 0	..	<i>Gazettes</i> , 1921	..	..	10 11 8
..	Mr. J. J. Smithies	..	..	3 0 0	..	Ditto for December <i>Gazettes</i> , 1921	..	..	15 2 4
..	Mrs. Groves ..	..	..	2 2 0	..	Printing, Stationery, Postages, etc., by	..	..	..
..	Dr. F. W. Stansfield	..	..	2 2 0	..	Secretary	..	..	4 8 3
..	Mr. G. T. Stephens	..	..	5 0 0	..	Cheque Book	..	..	2 0
..	Mr. T. E. Henwood	..	..	1 1 0	..	Balance at Bank	..	..	10 0 10
..	Mr. J. J. Sheldon	..	..	1 1 0					
..	The Rev. Canon Kingsmill Moore	..	..	1 1 0					
..	Mr. J. Edwards ..	..	..	1 1 0					
..	The Secretary ..	..	..	4 8 3					
..	Bank Interest ..	..	..	1 9					
				£67 16 9					£67 16 9

Audited and found correct this 29th day of August, 1922.

JAMES J. SMITHIES,

Auditor.

FINANCE FROM WITHIN.

Most Societies are subject to financial crises. For this there are many causes, but the commonest arise from the outside view of the subject which is generally taken. The Officers and Committee are inside, the bull's-eye of the target, at which the members who are outside discharge their more or less irresponsible criticisms.

Our B.P.S. has been passing through one of these crises. Its members appreciate their Society, and in particular they appreciate their *Gazette*. Well they may; the writer has no share in the management of the *Gazette* and is therefore free to voice the unanimous chorus of approval with which its numbers are greeted. The *Gazette* has made the Society famous the world round, requests for complete sets come from the ends of the earth. This appreciation of members from without is expressed in various ways; often it takes the form of criticism. "Why is my copy late?"; "Why is there not more frequent publication?"; "Why are there not more articles?"; "Why is the size not increased by the introduction of new features?"; and there have been those who added: "Why has the subscription been raised?" Of such kind are the arrows from without. Inside, the Editor and the Treasurer listen with gratification—and perplexity. If the outside view alone had to be considered, they would respond with enthusiasm. But when the matter is viewed from within, these are the kind of questions which have to be answered:—

What are we to do about our decreasing balances? In 1914 there was a balance of £94 15s. 6d., the balance in 1922 is £5 15s. 2d.

How are we to induce our interested friends to be more regular with their subscriptions? The amount outstanding in August, 1922, was 24 members' subscriptions.

Where can a means be found of keeping the cost of printing within possible limits?

In 1916 the cost of one issue of the *Gazette* was £4 17s. 8d. To produce three numbers then cost little more than to produce one number now, when an issue costs over £14.

Why is it that our friends do not act as propagandists and bring in new members ? There were 134 members in 1914. The number in 1922 has fallen to 72.

Why do so few of the members lighten the labours of our hardworked Editor by forwarding the results of their experience in the shape of contributions to the *Gazette* ?

Through the generosity of some of those who have viewed our finance from within the crisis which threatened to end the *Gazette* is past, and it has been decided to publish twice a year. This is a temporary arrangement made necessary by the facts to which attention has been called. But if this unveiling of our finances from within should lead the members to view the situation comprehensively, and quicken them collectively and individually into a more active support of the Society and the *Gazette*, there will be nothing to prevent the expansion of both Society and *Gazette* in any direction which the interests of fern-lovers may suggest.

FIRST IMPRESSIONS OF A MEETING OF THE B.P.S.

A VERY DELIGHTFUL EXPERIENCE.

For a great many years I have been a member of the Society, but never before had I the opportunity of attending an Annual Meeting ; I think I should have made opportunity could I have imagined the pleasure which such a Meeting can give. The place chosen this year simplified matters. I was spending August at Harlech, and Llanberis is in the neighbourhood. On alighting at Carnarvon, to change trains, a group of travellers about whom there was something distinctive, attracted me ; the initials on my bag attracted

them. Forthwith we were introduced all round. It was as though a great arm of welcome had embraced me ; I was at once at home.

As we travelled up to Llanberis the special interests of the party quickly became apparent. From the window it could be seen that ferns abounded, and sharp eyes hailed each new species with delight. On arrival there were further introductions to members who had already arrived, and we sat down to dinner and spent the evening as though we had all been lifelong friends.

What particularly impressed me then, and throughout the Meeting, was the spirit of comradeship which prevailed. A common fund of experience was, as it were, pooled. Here were the leading experts of the cult, and all that they knew was available for everyone ; the habitats, the history, the nomenclature, the culture of our favourites were discussed and illustrated from every point of view.

At Monday's Committee the conduct of the formal business by our President and Honorary Secretary did honour to the Society. I shall not duplicate the report of the important decisions given elsewhere, but it is a pleasure to place on record my impressions of the scrupulous fairness and the judicial acumen shown in awarding Certificates. One by one the owners submitted their favourites—the candidates for honours were many—the fronds were passed round ; their points were explained and noted ; then a vote was taken. In all cases the awards made were unanimous. The Committee was equally unanimous when a Certificate was refused. The one aim throughout was to reach right decisions. All felt for themselves and for others, that in each case justice had been done.

A prominent feature of the Meeting was variety hunting. It went on early and late. At breakfast there was always news of energetic starts "at six." After dinner the tran-

quillity of digestion was invaded by proposal for one more walk. On Tuesday there was an all-day excursion, with sandwiches. In the case of those who have not yet attended a Meeting, some misgivings as to these "hunts" might be pardonable. How about danger spots, or overwalking? Do the strong overlook the weak? What chance for the less initiated among the experts? If such doubts exist, let them be dismissed once for all. Everything might have been planned to suit the weakest; the stronger made bolder circuits, but the company was always forming and reforming, and thus it was made possible for each to do as much or as little as he or she pleased. In this connexion, the chivalry of the President and his consideration for his members will not easily be forgotten. While I was with the party there were perhaps no real "finds," though we were always finding. It is the special joy of the cult that something more or less (generally less) out of the common is always occurring. For this part of the sport we had in our Editor an unfailing mentor and arbiter. I do not suppose there were any members who did not at one time or other present a fern with something like a flutter of expectation. "Show it to the Doctor" was the universal recipe, as we brought these finds to one another. And the Doctor was never at fault. "Yes, not quite normal now, will be next year." "Interesting, but not uncommon." "Not enough departure to constitute a variety." "Frequently found so." With these, and such-like dicta, he often shattered hopes, but we were satisfied that he could do nothing else. The decision was given with authority and we felt that it was final.

If I were asked, in concluding, to sum up these impressions in a phrase, I do not think it could be better done than by quoting the President, as we dealt with specimens and shared spores at the Committee Meeting. "In our Society," he said, "there is no jealousy." That this was my experience what has been written ought sufficiently to show, but I cannot

deny myself the pleasure of adding a quite unique piece of evidence. Towards the end of my stay a member whose collection is famous handed me his catalogue and when I had studied its richness and variety, astonished me by saying "You are welcome to anything there of which I have a duplicate."

H. KINGSMILL MOORE.

THE FILMY FERN.

The filmy fern drapes o'er the face
 Of the crag where the wide cavern gapes ;
 A wonderful sight is the place
 The filmy fern drapes.

Each translucent frondlet escapes,
 Unless you shall carefully trace
 The medley of delicate shapes.

That network of intricate lace
 The craftiest needle but apes,
 Where, sprayed by the waterfall's race,
 The filmy fern drapes.

FRAS. W. THORRINGTON.

12th November, 1921.

"Ferneote," Curtis Road,
Emerson Park, Hornchurch,
Essex.

27th February, 1922.

To the Editor *British Fern Gazette*.

NOTES ON BRITISH FERN NOMENCLATURE,

vide the article by Dr. G. Claridge Druce in the December
number of the "*Gazette*."

Dear Sir,

Correspondence with Dr. Druce has elicited the following interesting comments, and I imagine that *Gazette* readers may find them of use as a corollary to his article:—

(1) *Re* Gen. 715. *Onoclea* (L.). sp. 2895. *sensibilis* (L.)

Notes by Dr. Druce.—"*Onoclea sensibilis* grew in a lane at Moreby, near York, H. Baines (Phyt. i, 492) and at Plemont, Jersey, in 1915. In both cases alien, of course."

716 "*Dryopteris* is a large genus as defined by Christensen. Its sections, or subgenera, might well bear the names *Lastrea* : *Phegopteris*."

"I see that Schinz suggests sinking *Polystichum* also in *Dryopteris*. I do not agree."

713 "Yes, *Pseudathyrium* is superseded by *Athyrium* on grounds of priority."

714 "The trivial *aculeatum* (L) was dropped on account of its being a nomen confusum; strictly speaking, it is said to mean *angulare*, therefore Hudson's trivial *lobatum* of 1762 is revived and used for the Prickly Shield Fern. This may necessitate a new varietal name."

"So, too, with *angulare*. If, strictly speaking, this should be *aculeatum*, great confusion would arise. Therefore the trivial *setiferum*, which dates from 1775 (Forskal Fl. Aegypt-Arab)."

"*Angulare* only dated from 1810 (Kit. in Will'd. Sp. Ph. v. 257.)"

- 716 "Wollaston's three species of *Filix-mas*. In my list
 "I give as var. c. *paleacea*, which as *Aspidium*
 "*paleaceum* was described by Don in 1825. Wollas-
 "ton described his *pseudo-mas* in 1855 and the two
 "names are said to be synonymous: hence I take
 "the older; but I think it deserves sub-specific rank.
 "Again, I use *abbreviata* in the sense of *propinqua*,
 "but I am aware that there are doubts about *propin-*
 "*qua* and *abbreviata* being the same: *abbreviata* is
 "the older trivial."
- 2899 "I suppose *aristata* refers to the strongly mucronate
 "teeth—but not very happily. We owe the trivial
 "to Villars."
- 2902 "*Oreopteris* dates from 1787. *Montanum* is said to
 "date from 1781, Vogler, but Schinz rejects it as a
 "stillborn name. I have not gone into this ex-
 "haustively."
- 2904 "I should prefer to keep the Beech, Oak and Limestone
 "Ferns separate as *Phegopteris*, Fée, as in my list.
 "If not, as a subgenus of *Dryopteris*."
- 2905 "Yes, *D. Linneana* was chosen to avoid the duplication
 "of the name."
- 2917 (724, *Hymenophyllum*) "*peltatum* on account of
 "priority of name."

Dr. Druce comments further, in regard to the way in which
 "priority" will often revive a name less suitable than the
 accustomed one. He says: "The difficulty of choosing the
 "first most useful name would result in confusion, because
 "people might not agree as to which was the most useful.
 "Directly one parts from the bed-rock of priority, you are
 "on the quicksands of individual caprice."

I make no apology for quoting these explanatory notes in
 full. They appear to me to be of considerable use as a help
 to understanding the reasons for the changes of names,
 which so frequently look quite arbitrary at a first acquaintance.

A. F.F. UNCO-GLOMERATUM.

A dozen years ago I purchased a plant of the above-named fern and knowing its aposporous character it occurred to me to try my apprentice hand upon it.

Preparing four 4-inch pots, giving abundance of drainage, the pots were filled two-thirds full of good open soil, loam, leaf-mould and sand; making the same firm and placing a crock on top I poured boiling water on it to sterilize the soil. Placing a piece of glass on the top of each pot, I set them aside until they were cold. Taking a frond from my plant I cut off the extreme ends of the fronds below a joint where it branches away in little clusters half-an-inch or so long: then, planting them in the already prepared pots of sterilized soil one inch apart and making them firm, I covered each pot with a piece of glass and placed them in a temperature of 55 degrees, keeping them close and moist. This was done in the beginning of September; within a few weeks the cuttings, so to speak, in three of the pots began to grow; those in the fourth pot all dried up and died; the reason why, I cannot tell, as they were all treated alike and kept in the same condition as regards heat and moisture. By the following August the plants had become crowded and the fronds had got mixed up with one another, so I potted them singly into pots one inch in diameter, using sterilized soil. I replaced them in the same temperature and kept them close.

In the following spring they were again shifted on, this time into 2-inch pots and they continued to grow nicely, some growing more quickly and making stronger growth than others, but the slow growing ones were the finest plants. Unfortunately, following the severe frost which occurred during the winter of 1916-1917, not one of them started to grow in the spring. I thought perhaps being wintered in a temperature of 45 degrees—my greenhouse boiler going off during the severe frost and could not be replaced owing

to the war—the sudden fall of temperature from 45 F. to 25 degrees of frost had been too much for them.

In my correspondence with my esteemed friend, Mr. Stansfield, of Sale, I told him of their untimely death, and he attributed it not to the frost, but to the dryness produced by frost. From whatever cause they ceased to live I can assure you I much regretted the early death of my beautiful plants. The parent plant I still have, but it has become a degenerate, a dwarf coarse type of *acrocladon* from which the variety originated.

I presume this mode of raising young plants is similar to laying down the fronds and is the development of the apical buds.

T. LEIGHTON.

10, Hamilton Place, Kilmarnock.

[Mr. Leighton's failure to raise plants was undoubtedly due to destruction by frost: although the roots and crowns are hardy the *fronds* of *A. Filix-foemina* are invariably destroyed by a very few degrees of frost. Our correspondent's cultures were not independent plants, but extensions of the original frond laid down. The apical knots are not "buds" in the physiological sense (*i.e.* bulbils) such as are found on *Scolopendrium v. densum*, or they would produce roots and new fronds; they are simply points of arrested development in the original frond and it is not until the frond has unrolled to its ultimate segments that prothalli are developed from which new plants can arise. See "Production of Apospory by Environment," *Gazette*, Vol. III., p. 237.—*Editor*.]

HIBERNATION AND ÆSTIVATION.

As some of our native ferns have adopted hibernation as a means of defence against the rigours of winter, so also one at least of our native Alpine, or mountain ferns has hit upon æstivation as a means of escaping the (equally objectionable in this case) rigours of summer. The fern in question is *C. montana*, which is only able to exist in a wild state in this

country at altitudes of 1,000 to 2,000 feet above sea-level, where it is found growing on moist dripping rocks. When brought down to lower levels it behaves like a wild bird in captivity and seldom appears thoroughly happy.

When the writer was stationed at Pontefract, where the soil and atmosphere are both exceptionally dry, and the geological formation Permian limestone, *C. montana* was temporarily planted under conditions almost the exact opposite of those selected by the plant when growing wild, the land being very dry and the soil heavy and devoid of humus. The plant took to the new conditions like a duck to the water, most of the fronds being a foot long and the rhizomes strong in proportion. Growth commenced very early and proceeded at high pressure, the serious business of life being practically over by the end of May. By early June, when other ferns were just waking from their beauty sleep, and *P. Cambricum* had not moved, *C. montana* had shed its spores and retired for the season so as to escape the devastating heat experienced during the hot summer months. The plant evidently took a similar view to the old foxhunting squire, who, at the end of the hunting season, bemoaned the sad fact that "we have now a long dreary summer in front of us."

That the writer's experience with this fern is not a solitary one is proved by the fact that fifty years ago he heard from a client who reported fronds 12 to 15 inches on *C. montana*, but the matter not having been confirmed by ocular demonstration, it was presumed at the time to be a case of mistaken identity, as there is some similarity in outline between the plant in question and *P. calcareum*, and it would be an easy matter for the uninitiated to confuse these two ferns.

Assuming that the soil alone was responsible for this most extraordinary transformation, the writer was recently at pains to import special soil from the place where this fern was behaving so very remarkably, but alas ! the hoped for

result failed to materialize, neither æstivation nor exuberant growth resulting. The exuberant growth is probably the result of æstivation, which itself is probably the result of special atmospheric conditions induced by a combination of unknown climatic conditions peculiar to that district.

Something of a similar nature occurs with *Adiantum lunulatum*, a native of India. During the winter or rainy season this fern is to be seen in all its glory, a most fragile and delicate fern almost filmy in appearance. When the rain ceases, and before the land becomes hard-baked, the fern promptly retires, and matures its crown an inch or more below the surface, where it is perfectly safe, although every scrap of vegetation on the surface of the ground is often licked up by the jungle fires which sweep harmlessly overhead.

H. STANSFIELD.

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British Fern Gazette.

VOLUME V.

EDITED BY
F. W. STANSFIELD, M.D., F.L.S.
(READING.)

PUBLISHED BY
THE BRITISH PTERIDOLOGICAL SOCIETY

President : Mr. W. B. Cranfield, F.R.H.S., F.L.S.,

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British Fern Gazette.

May, 1923.

EDITED BY

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(President: Mr. W. B. Cranfield, East Lodge, Enfield Chase, Middlesex.)

(Hon. Secretary and Hon. Treasurer: Mr. Charles Henwood, 21, Clifton Road, Maida Vale, London, W.9.)

KENDAL, WESTMORLAND.

THE BRITISH FERN GAZETTE.

NEW SERIES.

VOL. V.

MAY, 1923.

No. 1.

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EDITORIAL NOTES.

We learn that our past-President, Mr. Alex. Cowan, has sent a contribution of £5 to the funds of the Society, thereby bringing up the voluntary contributions, at and since the Annual Meeting, to the useful sum of £28 14s. 3d.

We present herewith a separate title-page for binding with Vol. IV., which was omitted from the last number of the *Gazette*.

Mr. Whitwell has very generously sent us his only plant (perhaps the only one now existing) of *Asplenium Adiantum-nigrum microdon*. It is a great responsibility to hold such a rare and unique fern. We hope to send Mr. Whitwell a division back before the close of the present year, so that the responsibility may be divided.

Mr. Leighton, of Kilmarnock, writes us to say that we misunderstood his letter (published in last number of the *Gazette*) with regard to his "cuttings" of *A. f.f. unco-glomeratum*. These, it appears, "sent out roots and formed crowns," which latter "afterwards sent up new fronds which continued

to grow until they were two and three inches long." He could find no prothalli in any of the cultures. Mr. Leighton's experience is quite different from our own and it is difficult to understand why his plants should have died unless they became dried up.

Mr. R. Ll. Praeger, of Dublin, has sent us a copy of *The Irish Naturalist* to which he has contributed an interesting monograph on *Asplenium Ad-nigrum acutum*, otherwise *Asplenium acutum* (Bory), in which he discusses the vexed question of variety or species for this fern. The matter naturally turns upon the still more vexed question of "What is a species?" We hope to refer again to this monograph in another issue of the *Gazette*.

THE AUGUST MEETING.

The Annual Meeting of the Society will be held at the George Hotel, Axminster, Devon, on Monday, August 13th, at 10 a.m. The district is not far removed from Chard, where particularly good hunting was met with in 1921. It is hoped that many members may be able to get to Axminster on Friday, the 10th, so as to put in a day's hunting and prospecting on the Saturday. The region is the scene of several of Moly's and Wills's exploits, but the experience of the Society at Chard proves that they did not exhaust it. We believe that good hospitality will be met with at the George Hotel (proprietor, Mr. Franks), but there are doubtless other places where comfortable accommodation can be had, if desired. Members who wish rooms to be retained for them at the George will please notify the Hon. Secretary a week or two in advance, if possible. Also please take note of the place and date of meeting as no further notice will be issued.

OBITUARY.

PHILLIPS: We regret to announce the death of our esteemed friend and past-President, Mr. W. H. Phillips, of Holywood, Co. Down. Mr. Phillips had attained to the patriarchal age of 92. Until well past his eightieth birthday he was a regular attender at our meetings, where his genial company was enjoyed by all who met him. He had been a great fern-hunter in his time and had many successes especially among *angulares*, perhaps his greatest being his *P. ang. setoso-cuneatum*, although his *P. a. rotundatum*, *P. a. divisilobum*, *P. a. brachiato-cristatum*, and *setoso-gracile* were very good things. His total finds of varieties amount to some scores.

WOYNAR: Another loss to the Society and to botany generally is that of the eminent Austrian botanist, Herr Woynar, of Graz. Our Society necessarily lost touch with him during the war. Hoping to bring him back to the communion we sent him copies of our last two numbers of the *Gazette*, but these were returned through the dead letter office with the grim superscription "Gestorben."

DR. DRUCE'S REVISED NOMENCLATURE.

On March 17th the President and Dr. Stansfield, by appointment, had a meeting at Kew with Mr. C. H. Wright, the fern expert, who had been deputed by the Director of the Royal Gardens to discuss with them the question of nomenclature. Dr. Druce's list of names is based upon the principles laid down at the Vienna Conference. We gathered that that assembly did not specially discuss the nomenclature of ferns, which was left to be dealt with at a later Conference at Brussels in 1910. At that meeting it was decided by a majority that the Vienna principles should be adopted, a motion for the preservation of the more familiar names of

Hooker and Baker, etc., being rejected by 88 votes to 61. There is evidently therefore a substantial minority against the rigid application of the Vienna code. Even the code itself is not in accordance with a strict rule of priority since (*e.g.*) the name *Phyllitis*, which it is proposed to substitute for *Scolopendrium*, only dates from 1756, whereas "Skolopendrium" is as old as the ancient Greek writers. For the present a useful *modus vivendi* is that adopted in the new edition of "Babington's Manual of British Botany," published in 1922. In the preface of this edition it is stated that "generic names whose authors did not employ the binominal system have been ignored. Such names should date for priority from the time when some binominalist author introduced them into the modern system. . . . This principle was not adopted at Vienna because M. Briquet stated that it would cause many name-changes as the result of rejecting Adanson's work. M. Briquet's fears were unfounded. Adanson's names are all rejected here (*i.e.* in the "Manual of British Botany") and the result is only one change, viz., *Chamagrostis* for *Mibora*, and the use of the latter was one of the first changes caused by the use of non-binominalist works. Further, the majority of the generic name-changes made in accordance with the Vienna code are due to the use of non-binominalist names. It seems clear that the rule was created in misapprehension and should be revoked since it leads to results the opposite from its purpose."

It is all a question of where in time the priority line is to be drawn. The Vienna Conference apparently drew it (so far as British ferns are concerned) at Hill (a British writer, 1756). Mr. Willmott, the Editor of "Babington," proposes to draw it at the publication of the "*Species Plantarum*" of Linnæus, the author of the binominal system. It is clear that the line must be drawn somewhere, otherwise we *may* find revolutionary records at Ur of the Chaldees or in the buried cities of the Incas or in the ancient literature of China or Japan.

Our own objection to Dr. Druce's list is chiefly to Adanson's generic name of *Dryopteris*, and that not on account of its date, but because the genus itself is so miscellaneous, including, as it does, evergreen and deciduous, rhizomatous and tufted, indusiate and non-indusiate ferns. Its disadvantages are so obvious that we feel certain it will have to be split up sooner or later. Even Dr. Druce is very half-hearted about the inclusion of *Phegopteris* of Fée in *Dryopteris*. If *Phegopteris* be admitted as a distinct genus from *Polypodium* (for which there is, perhaps, some reason) we see no excuse for the changing of the specific name of *phegopteris* into *polypodoides*. Again, if *Phegopteris* be merged in *Dryopteris*, for which we think there is no reason whatever, it is quite unnecessary to change the specific name of *Dryopteris* into *Linneana*. What is the matter with *Phegopteris phegopteris* or *Dryopteris dryopteris*? Have we not already *Emberiza emberiza* and *Gallinago gallinago* among birds? Our Sub-Committee is supported in its objection to the exceedingly mixed genus *Dryopteris* by the opinion of Mr. Wright, the Kew fern expert.

We note that an Imperial Botanical Conference is to be held in London in July, 1924; possibly the question of nomenclature may then be again raised.

THE PRESIDENT'S LECTURE TO THE HORTICULTURAL CLUB.

On February 27th last Mr. W. B. Cranfield delivered a lecture on British Ferns and their Varieties at the meeting of the Horticultural Club, Hotel Belgravia, London.

Starting from geological times the lecturer stated that ferns and their allies probably represented one of the earliest forms of vegetation. They existed in immense numbers and in gigantic stature when the general terrestrial temperature was much higher than that of the Tropics of to-day, and the

earth was enveloped in an atmosphere of vapour heavily charged with carbonic acid gas. Under these conditions ferns, mosses, equisetums, etc., assumed proportions comparable with the present growth of the largest timber trees. The fossil remains of many hundred species of ferns have been found in the coal measures. Ferns and their allies have, therefore, played an important part in the economy of the world. Many millions of years have passed during which both animal and vegetable life have undergone great modifications, but the Cryptogams have retained the early method of reproduction by spores. Ferns do not produce the richly coloured blossoms and delightful scent of the flowering plants and, for this reason probably, they have failed to become so universally attractive as their merits deserve, but even the normal ferns, when growing in congenial conditions, present a refreshing verdure and grace of outline, which, however, is far transcended by the choicest of the varietal forms, that have either been found as wildlings or raised from such finds by selective culture. There are between thirty and forty species of ferns indigenous to this country and these vary in almost every conceivable direction, from abnormally foliose sports to extremely attenuated, branched, crested, lax, convoluted and very finely divided types ; also in stature from giant forms to dwarf examples. In no other country are the native ferns known to vary to the same degree ; the reason of this departure from the type is not known, but when the change has taken place there would appear to be no limit to a fern's further capacity to vary, the ordinary varietal type becoming crested and *vice-versa* among the more protean varieties resulting largely in ragged and irregular offspring. All our native ferns possess the merit of hardiness, but, to attain their fullest development, some of the choicer varietal forms need the protection of a cold frame or conservatory. Many species are evergreen and of robust habit ; many forms of them, having been grown by

traders for a long time, are obtainable from nurserymen at a trifling cost. When planted in suitable environment these hardy ferns may be enjoyed the year round, whether in the fresh verdure of their early growth, or as mature specimens, bedewed with raindrops or outlined with a delicate tracery of hoar-frost. The method of reproduction by spores in Cryptogams differs from that of flowering plants which produce seed. The spores are produced usually on the backs of the fronds within capsules grouped in heaps known as sori, either naked or covered with an indusium differing in form in various species, which differences form an important factor in determining the species. Each species has its popular name ; thus *Athyrium filix-foemina* is known as the Lady Fern probably on account of its refined and delicate appearance ; *Lastrea filix-mas* is called the Male Fern presumably for the opposite reason ; *Polystichum angulare* and *P. aculeatum* are the soft and hard shield ferns respectively, and so on. Varieties are almost endless in number. In Lowe's Handbook, published in 1908, over 1,700 varieties are described, of which some 1,300 were wild finds. Many were, however, quite unworthy of record. Since that date many more have been found, from which vastly improved forms have been raised, until, after a few generations of selective culture, they are scarcely to be recognised as descendants of the normal types. In some ferns two forms of fronds are produced; for example, in *Blechnum* and *Osmunda*, and these are popularly spoken of as flowering ferns.

The number of spores shed annually by a fern can scarcely be conceived, but it has been computed that a plant of *Athyrium filix-foemina* possessing a single crown and 14 fronds, will produce annually 1,120,000,000 spores, every one of which is capable of producing an independent plant. The spores are very minute, but retain their vitality, in many cases, for many years. There is but little wonder that ferns spring up apparently spontaneously where local

conditions of moisture are favourable ; the spores may be borne by the wind for long distances. It was only possible to mention other modes of reproduction such as bulbils, basal buds, soral and apical apospory. The varieties of the various species are classified throughout on the same principle ; the plumose forms are usually considered to be the choicest and are frequently barren.

Mr. Cranfield illustrated his lecture with lantern slides as follows :—Fern fronds embedded in coal ; Sori and spores in various stages of vegetation and mature prothalli with male and female organs and the young ferns ; bulbils and aposporous growths in various stages of development ; *Asplenium trichomanes incisum Clementii* ; *A. trichomanes confluens* ; *Athyrium f.f. revolvens* ; *A. f.f. Victorix* ; *A. f.f. ramulosissimum* ; *A. f.f. kalothrix* ; *A. f.f. todeoides cristatum* ; *A. f.f. clarissima* ; *A. f.f.* vars. showing pedigree of Druery's *superbum* section ; *A. f.f. plumosum percristatum* ; *Blechnum sp. concinnum* ; *B. s. Maunderii* ; *B. s. plumosum*, Airey No. 2 ; *Lastrea pseudo-mas polydactyla*, Wills ; *L. ps.m. cristata* ; *L. ps.m. fimbriata-cristata* ; *L. montana formosa-cristata* ; *L. dilatata foliosa cristata* ; *Polypodium vulgare omnilacerum*, Oxford var. ; *P. v. grandiceps*, Parker ; *P. v. trichomanoides* ; *P. v. Cornubiense* ; *P. v. cristatum*, Henwood ; *P. v. Cambri-cum*, Henwood ; *P. dryopteris* normal and *P. d. plumosum* ; *Polystichum angulare grandiceps*, Moly ; *P. a. divisilobum nitescens* ; *P. a. divisilobum*, Bland ; *P. a. brachiatum*, Stansfield ; *P. a. stipulatum*, Carbonell ; *P. a. percristatum*, Moly ; *P. a. hirondelle*, Moly ; *P. a. divisilobum plumosum*, Jones and Fox ; *P. a. plumosissimum*, Birkenhead ; *P. a. div. plum.* *Baldwinii* ; *P. a. div. plumosum variegatum*, Harris ; *P. a. pulcherrimum*, F. W. Stansfield, No. 1 ; *P. ang. rarefactum*, Stansfield ; *P. aculeatum pulcherrimum*, Bevis ; *P. a. pulcherrimum*, Druery ; *P. a. gracillimum*, Druery ; *P. a. gracillimum*, Cranfield ; *P. a. pulcherrimum foliosum*, Edwards ; *P. a. pulcherrimum plumosum*, Green ; *Scolopendrium v.*

sagittato-projectum ; *S. v. Coolingii* ; *S. v. plumosum*, Stansfield ; *S. v. plumosum*, Perry ; *S. v. crispum Drummondiae superbum* ; *S. v. crispum nobile*, Bolton ; *S. v. crispum speciosum*, Moly ; *S. v. crispum* varieties on either side of a ditch ; the late Mr. C. B. Green's fernery ; the late Mr. Druery's fernery ; portrait of the late Mr. C. T. Druery.

The lecturer concluded by stating that the British Pteridological Society of which he had the honour of being President, was formed for the purpose of encouraging the cultivation of the varietal forms of native ferns and that the *Gazette*, published by the Society, afforded a large amount of interesting information. A number of questions was asked at the conclusion of the lecture, which led to an interesting discussion in which Messrs. C. E. Pearson, P. R. Barr, H. S. Rivers, Geo. F. Finley, Dr. F. W. Stansfield and others took part. Messrs. T. E. Henwood and C. Henwood and Dr. Stansfield were present as guests of the lecturer.

[The above report is taken, with slight abbreviation, from the *Gardeners' Chronicle* of March 13th.—Editor, *B.F. Gazette*.]

THE LADY FERN.

In woodland deep, the Lady Fern

Beside the rocky steep,

Rejoices with the rushing burn

In woodland deep.

Her emerald tresses sleep,

And then in frolic traffic turn

To meet the zephyr's leap.

Lo, she shall all our homage earn

And our affection keep ;

So graceful is the Lady Fern

In woodland deep.

FRAS. W. THORRINGTON.

12th November, 1921.

INSECTICIDES.

The fern grower, whether in town or country, and whether his plants are grown under glass or in the open air, finds it necessary to use insecticides of some kind or other in order to keep them free from pests of various kinds. Under glass the green and black fly (*Aphides*) are sure to be troublesome while, both in the greenhouse and outside, the white fly (*Typhlocyba*) if unchecked will quickly disfigure the fronds. This last vermin is much more prevalent in dry districts and in dry seasons, but is to be found, more or less, in every part of the country and even in wet seasons. Insecticides are of many kinds, or rather they have many names, but may be conveniently divided into two classes, viz., the poisonous and the non-poisonous. Nicotine is the basis of most of the poisonous kinds and may be used either in the liquid form by spraying or may be vaporized by boiling or diffused by burning. Fumigation can, of course, only be practised in close structures such as frames and houses. In the open air the only practicable method is spraying or washing. The well-known XL All Vaporizing Compound depends for its efficacy on nicotine and is a most convenient and effective preparation probably the best that can be used for fumigating purposes. It is, of course, necessary that the house should be fairly air-tight or much of the vapour will escape, especially in windy weather. Still, *rainy* weather should be chosen, if possible, for fumigation as there is much less waste of the vapour through the crevices of the glass. It is very important that the white fly (*Typhlocyba tenerrima*) should be attacked while in the larval state, as, after it becomes winged, it is much more resistant to fumigation and is also able to escape from spraying operations by flying. Another poisonous insecticide, even more deadly than nicotine, is hydrocyanic acid gas, but this is a dangerous thing for the amateur to handle and should only be used under the advice, or with the assistance, of an expert. In any case, it is rarely, if ever,

necessary in the fern house. The non-poisonous insecticides depend for their efficacy upon their power of blocking up the spiracles or breathing pores of insects and thus causing death by suffocation. Soft soap is the type of this kind of insecticide and is an excellent remedy in itself if used in the proportion of 2 oz. to the gallon of soft water. Emulsions of various oils, mineral and vegetable, are used in the same way and most of them are effective if the insect can be thoroughly wetted with the emulsion. Unfortunately, nearly all these soaps and emulsified oils are injurious to the tender young fronds of ferns and to *all* the fronds of those with velvety surfaces such as *P. dryopteris*, *Adiantums*, and *L. Thelypteris*. For these, when fumigation is impracticable, we have found a solution of two drachms (teaspoonfuls) of pure nicotine to a gallon of soft water to be a useful application causing the minimum of injury, although even this causes a little discolouration of the partly expanded fronds of *P. dryopteris*. If a sharp look-out be kept for the first appearance of vermin and the remedy be promptly applied, not only is a great deal of trouble saved, but there is much less risk of injury to the fronds than by the repeated drenchings which are necessary when the insects are mature and more numerous. The species of *Otiorrhynchus* (weevils) seem to be proof against all insecticides, which can be applied either by fumigation or spraying. We have recently experimented on the destruction of the larvae, *while in the soil*, by means of solutions of nicotine. It is obvious that if this could be effected without injury to the plant a great point would be gained as it is not always desirable to shake out and examine the roots of a fern in which grubs may be suspected. We potted a healthy young plant of *Polystichum aculeatum* and mixed with the soil some six or eight larvae of *O. sulcatus* of various ages. When the plant was established and the grubs presumably busy we moistened the soil with solution of nicotine of varying strength from 1 drachm to the gallon up to 1 oz.

to the gallon of water. It was not until the latter concentration was reached that the grubs were found to be all killed, although some of the smaller ones succumbed to $\frac{1}{2}$ -oz. to the gallon strength. The plant survived and is now healthy, although most of the roots were killed in the process, but whether this was due to the nicotine or to the repeated disturbances necessitated by the periodical examination of the larvae is uncertain. The point established is that the grubs *can* be killed *in situ* and without necessarily killing the fern on which they are preying. Further experiments are, however, desirable on the action of nicotine solutions upon the roots of ferns of different species.

POLYPODIUM CAMBRICUM.

Polypodium vulgare, var. *Cambricum*, is one of the very few varieties of interest to the collector and cultivator of British ferns, of which any notice is taken in the ordinary text books of Botany. It is mentioned, for instance, in the Flora of Babbington, of Bentham and Hooker, Hayward and others, sometimes as *P. cambricum*, Willd., sometimes as *P. Cambricum*, L. Good varieties, even plumose forms of other species, have been found, but for some reason these have raised no enthusiasm in the heart of the critical botanist.

My first acquaintance with this fern was some years ago, in the garden of Dr. A. H. Trow, now Principal of the University at Cardiff. It formed a fine clump, well established out of doors in a shady corner near some beautiful specimens of *Osmunda regalis*, and was probably responsible for my earliest interest in fern varieties. This particular plant, I believe, was found on Conway Castle, though the earliest specimen appears to have been discovered by John Ray near Cardiff.

A local botanist by the name of Storrie, who published a "Flora of Cardiff" in 1886, states that "*Polypodium vulgare*, var. *Cambricum*, with the segments pinnatifid a second time, was collected between Dynas Powis and Cwn George by John Ray, the Father of English Botany, in 1690, and his specimen is still preserved in the Natural History Museum at South Kensington. It was completely destroyed about ten years ago by an itinerant fern dealer, who uprooted every plant and sold hundreds at one shilling each." Storrie quaintly adds: "I bought one myself."

Ray's plant, of course, was the original *Cambricum*, but practically identical forms have since been found in other places. The late Mr. Druery treated the subject rather sketchily in his book, but Lowe's little book in the Young Collector Series gives a good deal more information. There *P. Cambricum* is treated under sub-division *Plumosum*, which includes well-known varieties such as *Barrowii*, *Prestonii*, *Oakeleyae* and *pulcherrimum*. A Mr. Joseph Sidebotham seems to have had his full share of fortune, having found *Cambricum* forms at Beaumaris and Conway Castle; also at Troutbeck near Ambleside; and at Flenarim in County Antrim. Others have found them in South Devon, Monmouthshire, Glamorganshire, Cheshire, and also near Bristol. Lowe remarks that the Irish form is not sterile, which fact I imagine at once disqualifies it as a "*Cambricum*," which is always described as sterile. G. W. Francis, in his "Analysis of British Ferns" (my copy is the Third Edition, 1847) has a remark bearing on this point. He says that the Irish plant is somewhat different from the *P. Cambricum* of Linnaeus and is apparently his variety *sinuatum*, intermediate between the usual state of the plant and the *Cambricum*, the latter being "usually without fruit," both in its wild and cultivated state. It would, I think, make an interesting article if one of our Pteridological experts would write of the forms which might be included under *Cambricum* proper. I often wonder

what has become of these old finds, whether any are retained in cultivation, and whether there is any recognisable distinction between them.

Little further need really be said about this beautiful and well-known fern, but I am tempted to add a condensation of Lowe's description of it, for it is about the best I have seen.

Polypodium Cambricum, then, is somewhat ovate—oblong in form and is throughout bipinnatifid. The lobes are narrow near the rachis, become wide in the centre, narrowing again to a pointed apex; they are crowded together so as to overlap each other, except at the base and apex (of the lobes). The margin is deeply cut into narrow, pointed, serrated lobules, with the exception of their base and apex. This beautiful species is always barren.

[We have seen an Irish form of *Cambricum*, but it was not fertile and was undistinguishable from the original Welsh variety. Other bipinnatifid and bipinnate forms have been found both in Ireland and in England (probably also in Wales), but they are distinguished by being more or less fertile, by having less acute lobes and generally a slightly thicker texture than true *Cambricum*; *P. v. pulcherrimum*, Atkinson, is the best of these being tripinnatifid, *i.e.* even more divided than *Cambricum*. True (barren) sub-varieties of *Cambricum*, all quite distinct, are *Barrowii*, *Hadwinii*, *Prestonii*, *plumosum* *Whilharris*, and *Cambricum*, Henwood, the last found by our Hon. Secretary near Cromer.—*Editor.*]

S. P. ROWLANDS.

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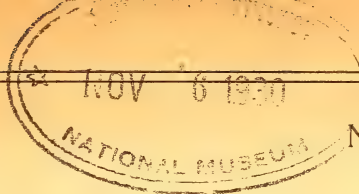
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EDITED BY

F. W. STANSFIELD, M.D.

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(Hon. Secretary and Hon. Treasurer: Mr. Charles Henwood, 21, Clifton Road, Maida Vale, London, W.9.)

KENDAL, WESTMORLAND.



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THE GENETICS OF VARIEGATION IN A FERN.

We have received via Mr. H. Stansfield an extract from *The Journal of Genetics* under the above title. The paper is an account of an elaborate and scientific research, at the John Innes' Horticultural Institution by Miss Irma Andersson, under the direction of Professor Bateson, into the reproduction of *Adiantum cuneatum variegatum*. The result of the work is to show that *all* the ferns raised are variegated ; in other words, the variety comes perfectly true from spores. Not only are the ferns (Sporophytes) all variegated, but the prothallia which produce them are also variegated. This latter fact had not been established by previous work upon the subject. The prothallia which result from a sowing of the spores of the fern are, however, of two kinds which may be roughly described as dark green and pale green. The difference between these two kinds consists in a difference of the chloroplasts (*i.e.* masses of green protoplasm) which line the cells of the tissue. In the dark green the chloroplasts are comparatively large and of a vivid green while in the

pale green they are distinctly smaller and of a dull grey-green colour. It is the dark green prothallia alone, however, which produce ferns, while the pale green ones grow for a short time and then die. The dark green ones seem entirely green at first, but all shortly develop pale stripes: this is the variegation of the prothallia. The pale stripes seem to serve no particular function as the ferns are all produced upon the dark green portions of the prothallia. Even entirely white ones, which sometimes appear, are always developed from the dark green parts and never from the pale stripes. For reasons of convenience of examination the spores are not sown upon earth, but upon films of agar in Knop's solution* (a clear transparent jelly) in porcelain dishes. In this medium not only prothallia but ferns are produced and grow for some time. They are, of course, perfectly clean and can be easily examined as transparencies under the microscope. We hope the life history of other variegated ferns will be investigated as they do not all come true from spores. Moly's *angulare pulcherrimum variegatum*, for instance, produces a large proportion of variegated offspring, but some are perfectly green. Padley's *P. ang. inæquale variegatum* comes true, but it has been crossed with a green polydactylous form, the result being a variegated *polydactylum*. This latter produces only a small proportion of variegated offspring and the fern itself is apt to lose its variegation and to become simply a green *polydactylum*. Presumably of the prothallia of these ferns not all are variegated. There are other variegated ferns which do not produce variegated offspring at all, while, in many of them, the variegation in the sporophyte is unreliable and non-permanent. Plants of *Pteris aquilina* are not infrequently found with some variegated fronds, but under cultivation the variegation is found to disappear although it may occasionally crop up.

* Knop's solution consists of a solution of 1 gram each of Potassium nitrate and Potassium phosphate, and Magnesium sulphate with 3 grams of Calcium nitrate in 1 litre of water. The usual strength of the agar solution is 15 grams of agar to 1 litre of Knop's solution.—F.W.S.

again to disappear. The same thing happens in *Lastrea montana*, of which a few beautifully variegated examples have been found, all of which proved to be inconstant.

Occasional variegation has also been found in *Asplenium Adiantum-nigrum*, in *Polypodium vulgare*, *Blechnum spicant*, *Lastrea dilatata*, *Osmunda regalis* and *Ophioglossum vulgatum*. It is not uncommon in *Scolopendrium vulgare*.

We congratulate Miss Anderson and the John Innes' Institution upon this very thorough piece of research work.—EDITOR.

THE AUGUST MEETING.

The Annual Meeting of the Society was held on August 13th at the George Hotel, Axminster. The President, Mr. W. B. Cranfield, occupied the Chair, and there were also present members from London, Warlingham, Horsham, Reading, Clevedon and Dundrum, Ireland. The minutes of the last Meeting having been read and confirmed, Mr. Cranfield was unanimously re-elected President, while the old Vice-Presidents were re-elected with the addition of Mr. T. E. Henwood and Mr. G. E. Stephens. The old members of the Committee were re-elected with the exception of Messrs. Henwood and Stephens and with the addition of Mr. P. Greenfield. Mr. C. Henwood was re-elected Hon. Secretary and Treasurer, Mr. Smithies as Auditor and Dr. Stansfield as Editor of *The Gazette*. The Treasurer's report was read and showed a substantial balance in hand. A complete list of officers as well as the balance sheet are published on another page. It was resolved that the next Annual Meeting should be held at Newcastle, Co. Down. This is close to the Mourne Mountains and will probably be new hunting ground to most of the members.

The President showed an interesting series of fronds, most of which, however, were below their normal development and character in consequence of the exceedingly dry and inclement season. Among them were *P. angulare Baldwinii*

seedling No. 1, a number of seedling forms of *P. acul gracillimum*, *P. acul. pulcherrimum*, Druery, several seedlings from a *P. angulare pulcherrimum*, which he had received from Mr. H. Stansfield, and three or four seedlings from his own *P. ang. falcato-tripinnatum*, which is itself a seedling from Moly's *divisilobum falcatum*. One of these was a *falcate divisilobe* on the lines of Moly's find, but so great an improvement upon its grandparent that a certificate was awarded for it under the name of *P. ang. divisilobum falcatum*, Cranfield. A certificate was also awarded to Mr. Cranfield for *P. a. divisilobum plumosum Baldwinii* Seedling No. 1. The Rev. Canon Kingsmill Moore shewed also a very fine *falcate divisilobe* from his *falcato-pinnulum*, the origin of which is uncertain, but which strongly resembles Moly's strain. A certificate was awarded to Canon Moore for this and also for *P. ang. divisilobum venustum*, a seedling from the Jones-Fox strain, somewhat like *divisilobum quadripinnatum*, Jones. Both these ferns were very finely grown and in excellent condition testifying to the superior climate of Ireland to that of the South of England for fern-growing purposes, this year at all events. Canon Moore also exhibited fronds of a very fine *angulare divisilobe* somewhat resembling *divisilobum*, Bland, which, he said, had been raised from a bulbil of *P. a. div. plumosum laxum*, Jones. It is well known that bulbil sports do occur in ferns, but this was the most striking example which had been brought to the notice of the Society. Mr. Stephens showed a plant of a very neat *angulare cristatum* or *percristatum*, which he had found in Dorset on his way to the Meeting. The members mostly remained at Axminster for the rest of the week and the neighbourhood was diligently hunted for miles around. In consequence, however, of the very dry season the success was not great. The ferns had mostly been cut close by the hedge-trimmers early in the season and, in consequence of the drought, they had made little or no new growth, while the fronds which had escaped

damage were hanging limp, withered, and dusty. The following species were found :—*P. angulare* and *aculeatum*, *L. filix-mas*, and *paleacea*, *L. dilatata*, *Asplenium Ad.-nigrum* and *A. Ruta-muraria*, *Scolopendrium vulgare*, *Athyrium f.-fœmina*, *Blechnum spicant* and *Polypodium vulgare*. Small variations were found in *paleacea*, *angulare*, *aculeatum* and *Scol. vulgare*, but beyond the *P. a. percristatum* previously recorded, nothing of importance was collected. [Dr. Stansfield found a small, crippled and deformed *angulare*, which he took home as a very forlorn hope for *brachiatum*. It has since made new growth and turns out to be quite a promising *brachiatum*.] The party noticed a very nice form of *Scol. v. crispum* growing in the window of a house in the outskirts of the town and the President ventured to call and inquire whether it was a local find. He was informed that it had been found in the neighbourhood some years previously and the finder, Mrs. Bradford, kindly presented him with a division.

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THE BRITISH PTERIDOLOGICAL SOCIETY.

BALANCE SHEET, 1923.

1923.		1923.	
	£ s. d.		£ s. d.
To Balance at Bank from 1922	.. 10 0 10	By Paid Affiliation Fee, R.H.S. ..	.. 2 2 0
" Subscriptions and Donations	.. 37 5 0	" Paid for September <i>Gazettes</i> ..	.. 10 15 6
" Sale of <i>Gazette</i> ..	.. 2 6	" Ditto, May ditto ..	.. 8 4 0
" Advertisement ..	.. 2 2 0	" Ditto, Receipt Books and Note Paper ..	.. 1 15 6
" Interest ..	.. 1 11	" Printing, Stationery, Postages, &c., by	
		Secretary ..	.. 4 14 6
		Commission ..	.. 1 5
		" Balance at Bank ..	.. 21 19 4
	£49 12 3		£49 12 3

Audited and found correct this 7th day of August, 1923.

JAMES J. SMITHIES,

Auditor.

FERN HUNTING WITH THE SOCIETY.

A LIBERAL EDUCATION.

As I was struggling towards Axminster, a day of railway carriages, prolonged by two hours, out of respect, I suppose, to the holiday season, I said to my neighbour (he had claimed the right of talk most of the way): "If I were to tell you the object of my journey, you would probably think, though you would be too polite to say it, the number of fools in the world is wonderful." To my surprise, for he was of the class whose craniums are supposed to have undergone special seasoning from the bargains which they strike, he responded to my fern-hunting confessions by saying that he believed ferns to be a delightful hobby, and was sure that the pursuit of them must be full of interest, and also extremely valuable in connexion with the work of a clergyman. Had he been able to join us in our excursion he would have been invincibly confirmed in his judgment.

Devonshire lanes proved valuable hunting grounds; they were valuable from what they withheld as well as from what they gave. The prevalence of the motor in all shapes and forms, from the great chars-a-banc and omnibuses which sweep the sides, to the impetuous cycles which tear up the centres, has revolutionised the roads. No longer do the ferns rise in their beauty attaining the stature and decked with the grace which the climate of Devon can give; everywhere the billhook has been busy—"Make the way clear for the motors" is the cry, and beauty has to bow before the "Juggernaut" of traffic. A further trouble has arisen this year from the weather; the absence of rain, and the presence of dust, have parched and choked our favourites. The *Polypodiums* look like shrivelled tinder on the wall; the *Scolopendriums* flat and flabby cry pitifully for water as we pass; the stronger *Polystichum* and *Lastreas* are often so dust-choked that their faces want a washing before the

features can be seen. Such were the disabilities from which the searchers suffered, ferns slashed and maimed, poisoned with dust, in danger of perishing for want of moisture. On the other hand, ferns in rich variety were there, about that no question could arise, and the search for the most beautiful made fine call upon the skill and perseverance of the searchers.

Watch that party as it moves. High banks, as is the custom in Devon, rise steeply from the lane that has been chosen. Some take one side, some the other. To the uninitiated and profane they might perhaps appear fit food for fun—a collection of figures in easy clothes—sunproof hats, all armed with stout sticks, many bending under great cases of tin, all peering intently into hedge or bank as though they expected to strike gold.

But that is exactly what they do expect ; for to the fern-lover a good “find” is as gold. See the care with which each promising specimen is coaxed out and examined ; truncated, mangled and dust-destroyed it seems at first, but the skilled eye at once constructs the whole from the parts, and foresees what the plant will become in favourable conditions. To such a party, high bank, deep ditches, thick hedges prove no obstacles ; hooked sticks, sharp trowels and, above all, limbs ready for fatigue and not afraid of scratch or sting, overcoming difficulties, and everything worth notice is brought to observation.

If Axminster and its neighbourhood gave nothing that was wholly new, it provided many interesting finds. In a single lane perhaps a dozen different *polystichums* were found. They varied from the type, of which there were few, up to bold plants which came near deserving the title “*tripinnatum*.” To traverse such a lane in such company is worth a six months’ study of fern books ! Each hunter is continually bringing in specimens, keen eyes take note of the various points of interest and divergence till something

like a complete history of the *Polystichum* in its multitudinous phases lies disclosed.

An experience such as this may well be termed a liberal education in fern love ; but the fern hunts of the Society are even more than this. Ferns form the chief, but by no means the sole interest of members. The wild flowers, the birds, the butterflies, the trees, the shrubs ; the geographical, the geological formation of the neighbourhood ; the buildings which man has raised to mar or adorn—all come under notice, and there are few beyond the powers of some one or other of the party to illustrate or expound. In a very real sense a fern hunt with the Society may be described as “ a liberal education.”

H. KINGSMILL MOORE.

OBITUARY.

We regret to announce the death, in July last, of Mr. Thomas Bolton, of Warton, near Carnforth, a very early member of the Society and, for many years, a member of the Committee. He resigned his membership about a year ago, presumably on account of failing health. Having a favourable soil and climate at Warton he was a very successful cultivator of British ferns. Although not the actual finder he introduced to the Society *Asplenium trichomanes incisum Clementii*, one of the most beautiful ferns ever found. He was also the introducer of *Scol. v. crispum*, Bolton and *S. v. crispum variegatum*, Bolton, two very fine and distinct forms, but whether these were found or raised we do not know.

OUR FRONTISPIECE.

P. ANGULARE PLUMA-PARADISEÆ—F.W.S.

This is one of the best of the seedlings raised by Dr. Stansfield from *P. a. plumosum rarefactum*, H.S. The sub-division is finer than anything previously seen in this species. The tips of the pinnæ and pinnules are curly and aposporous,

and the general effect is one of lightness and grace not surpassed by any British fern. In addition to the above there are from the same batch:—*pluma Cygni* (Swan's feather), *pluma mollissima* (Eider Duck's feather), *pluma Struthionis* (Ostrich feather), *pluma Ardeæ* (Egret's feather), and several others not yet named. They are slow growers and probably not one of them has yet attained to its full development.

FERN GOSSIP.

Since our last issue there has been no record of anything in the way of new finds of British ferns beyond those mentioned in this number. Nevertheless, things have happened. Mr. J. Edwards writes that he has obtained spores upon *Lastrea paleacea fimbriata-cristata angustata*, Cropper. The same variety has also produced spores in my own garden. These are the first records of spores upon this variety although it was raised more than twenty years ago. This fern is remarkable inasmuch as it grows, and produces fronds, practically without forming any roots, rarely more than one or two short fibres being found when the plant is turned out, although it may be a healthy looking little shuttlecock with plenty of fronds. It is hoped that, if seedlings can be raised, which now seems probable, the resulting plants will be more enterprising in this respect and consequently more vigorous. Another fern, raised by the same grower (Cropper) and about the same time, is *Last. paleacea apospora cristata* (see *L. filix-mas acroclodon*, *Gazette*, Vol. II., p. 189.) This variety makes plenty of roots, but very few fronds, and these latter are of very short duration, generally turning yellow and withering after three or four months of life. As a result there are rarely more than two or three fronds to be seen at a time upon any single plant. This year, however, a plant in my collection has made seven fronds nearly two feet in length and presents quite a furnished appearance. The first frond of the year bore some eight or nine small sori

(this being the first time any signs of spores have appeared). The frond which bears them is now of a pale yellow, almost ivory, colour although still quite perfect in form. The sori are still green and it is doubtful whether the spores will ripen. Two other fronds are in a state of incipient anaemia, while four are fairly green and healthy. No other frond than the first has shown any signs of spores. Another reputedly barren fern, which has this year produced a few sori, is Elworthy's *P. angulare plumosum*, found in 1856, and recorded by Lowe as "a sterile form." This is one of the most beautiful plumose forms found wild and is a good grower in the open air. *Athyrium* f.f. *unco-glomeratum*, raised some fifty years ago, has also this year for the first time produced spores in the hands of Mr. H. Stansfield; these have been sown and are germinating.

HUNTING FOR SCHISTOSTEGA PENNATA.

The subject of these notes, although not a fern, is from a spectacular point of view perhaps one of the most interesting of our native cryptogams. It is found growing in caves and in clefts of rock, where but little light can reach it, where under certain conditions it shines like burnished gold. It is a microscopic plant, and a close inspection with the naked eye reveals nothing more striking than a faint olive-greenish tinge on the surface of the rocks. The plant when examined microscopically appears to consist of small featherlike growths, hence the name. When well established, the growing points appear (when viewed from a short distance and at a certain angle) to reflect the light in such a manner as to present the appearance of a sheet of burnished gold in brilliant sunshine. A closer approach or an alteration in the angle of vision renders the plant almost invisible.

On our first introduction to this plant, now some sixty odd years ago, it literally lined the mouth of an old and disused coal mine which had been driven horizontally into the hillside.

The roof, sides and floor for a distance of twelve yards from the entrance, shone with almost uncanny brilliance.

The aspect was west, and the altitude probably about 800 feet. *Allosorus crispus* grew in the immediate vicinity, but the prevailing fern is now *L. dilatata*, not luxuriant types, but all battered and unhappy-looking specimens.

In the year 1870 a cloudburst occurred which brought down much debris from the land above, some hundreds of tons being deposited at the mouth of the cave, making the latter inaccessible and shutting out the light to such an extent that the habitat was destroyed. In July of the current year we decided on a pilgrimage to the former habitat (which before the above-mentioned catastrophe had been considered the Mecca of all British muscologists) with the almost forlorn hope that a few vestiges of the moss might perhaps still exist. We found that the high price of coal had tempted the owners to reopen the old coal mine which had lain dormant for over a century. The debris had been cleared away, thus admitting the light without which the moss could not exist. Several square yards of the moss were in nice condition, and the cave bids fair to attain to its former great glory. We took away a small quantity with a view to establishing a colony on the estate of a Welsh client who is in a position to provide the necessary moist conditions.

Instead of retracing our steps we ascended the mountain, and being quite off the beaten track, missed our way, tramping wearily over the moor for what appeared, owing to the uneven state of the surface, to be an interminable number of miles, but which would probably not be more than five, without meeting with any sign of human habitation. Our eyes were, however, eventually gladdened by the sight of a house in the distance, and we made a bee-line for it. On reaching our objective we found conditions suggestive of the XIVth century in this Ultima Thule. The oldest inhabitant living in patriarchal style and surrounded by three generations

of olive branches. We appeared to be objects of considerable solicitude to the aged Nestor who presided. This solicitude we imagined to be due to our spent and weary condition, but we subsequently discovered that our venerable appearance and presumed antiquity invested us with a degree of sacrosanctity in the eyes of the patriarch which no other attribute could possibly have conferred. We called to mind the words of the writer who said : " What a truly wonderful and glorious thing is ripe old age ! There is an oily benignity about fat old age when it neither drinks nor swears, which overwhelms us with a sense of the enormity of our crime in being guilty of comparative youth." Our mental reflections were disturbed by a peremptory command to sit at our host's right hand as he wished to speak to us. The catechism proceeded as follows : " I reckon you will be a long, long way ower 70, gaffer ? " Now it would have been an easy matter to have covered ourselves with glory by claiming some five or six score years, but we remembered the admonitions and exhortations of our preceptor in early youth, and still retained a vivid recollection of the ultimate destination of all liars. To our credit, therefore, be it recorded that we indulged neither in the *suppressio veri* nor the *suggestio falsi*, but deprecatingly informed our host that we could claim no such honourable distinction, and that several moons must wax and wane before we should attain to the beatific period of septuagenarianism. Our host discounted his former cordiality some 75 per cent., evidently feeling aggrieved at his own lack of discrimination in having wasted so much sweetness on the desert air of a mere sexagenarian and remarked : " We thought you might happen be haymakers when we yerd the dogs barking ! " We were regretfully compelled to inform him that we occupied no such utilitarian niche in the general scheme of nature, that we were but humble *Schistostega pennata* hunters who had lost our way, and would be thankful if we could be provided with water for a bath,

and something in the nature of solid refreshment. "If you have shôt onny o' them things you might leave us a couple if they are onny good to ait," suggested out host. We administered the *coup de grace* to any lingering vestiges of respect our host might still have entertained for us, by informing him that the only shooting in which we ever indulged was an occasional stray shot with a no more lethel weapon than the *arcus longus*; that the contents of our bag consisted of microscopic botanical specimens which we feared would prove a very unsubstantial addition to his larder.

We eventually reached lower levels without further mishap, and being overtaken by a friendly motor car, were whisked back to civilization and a well-earned rest.

H. STANSFIELD.

ASPLENIUM LANCEOLATUM MICRODON.

This mysterious fern appears to have become almost, if not quite, extinct of late years. It is stated by Lowe to have been first found in Guernsey in 1855, afterwards again in Guernsey and also near Penzance. The same author describes it without hesitation as "a hybrid with *marinum*." Moore, however, in his "Nature-printed Ferns," published in 1855, puts it down as a variety of *A. marinum*, but thinks that "where better known it will be found to be a distinct species." The idea of its being a separate species has been long given up and is at once negatived by its barren character, for, although it produces (or shall we say *produced*?) plenty of sori the sporangia seem to be all abortive and contain, as a rule, no spores. Its relation to *A. marinum* has probably been assumed because of its simple *pinnate* form which resembles *marinum* much more than *lanceolatum*. The texture, however, is quite different from that of *marinum* and is, if anything, thinner even than that of *lanceolatum*. Some years ago I had a beautiful plant of *microdon* which had

been sent to me by Mr. H. Stansfield. In 1916 it attained its maximum development and I was struck by the resemblance of the confluent tips of the fronds to *Scolopendrium vulgare*, these being quite different from the terminations of *Asp. marinum*. In the same year the plant produced what seemed to be a few perfect sporangia among the crowds of abortive ones, the former standing out conspicuously on account of their globular shape and black colour, whereas the abortive ones are at first white, afterwards turning to a pale brown. It occurred to me to sow the spores from these apparent sporangia, but 1916 being a year of unusual stress, I was unable to do so, but preserved a frond with its adherent sporangia. The severe frost of the winter of 1916-17 killed my plant, greatly to my regret. I made inquiries in every likely quarter (including Kew), but was unable to hear of any one who still had the variety. Under these depressing circumstances I sowed my spores in the summer of 1917, *i.e.* a year after they had been produced, hoping vaguely that I might obtain plants, although there was no record that *microdon* had ever been sown much less produced seedlings. The following year a sparse crop of prothalli was produced in the spore-dish and my hopes rose. When fronds began to appear, however, I was disappointed for the fronds were mostly those of *Polypodium dryopteris*, which sows itself very freely with me. All these were picked out as soon as recognized and the spore-dish was removed to the dwelling-house with a view to excluding any more stray spores. It was not until 1921 that anything appeared which could possibly be *microdon*, but late in that year a little group of very tiny fronds came from one small patch of prothalli; they were obviously different from anything which had previously appeared and seemed to be all alike, some eight or ten altogether. Again my hopes rose. The tiny plants were carefully picked out, inserted in sterilized soil in a separate pot, and jealously guarded against frost and insect

enemies. During the ensuing winter several of them died, apparently from inanition, but in the spring of 1922 there were half-a-dozen plants still living, but so small that they could hardly be distinguished without a lens. Two or three of these outstripped the rest and turned out to be *Scolopendrium vulgare*, not normal, but not belonging to any recognized variety—simply little bastard rogues. The remaining ones lingered on without making much progress, but at the end of 1922 one of them had pinnatifid fronds and I was hopeful that it would be *microdon*, although the largest frond was only about a quarter of an inch in length. Three or four others remained undistinguishable. In the spring of 1923 I was laid up by an attack of acute sciatica, but on getting up my first visit was to my *microdon* pot and I was horrified to find that a growth of fungus had spread over the soil and destroyed every frond. Of the “largest” plant, however, after flooding it with permanganate solution, there remained a green speck, visible only through a strong lens, the size of a pin’s point. After a month of suspense this sent up a hair-like frond an eighth of an inch in length—a stem without a lamina—which was followed by two or three tiny frondlets. The plant is now (September) about as large as it was a year ago, but is more definite in form, and to my mind looks like *microdon*. Since, however, the whole thing could be buried comfortably under a sixpence it is still too early to be positive about it and it may also turn out to be a *Scolopendrium*.* In 1922, acting upon the hypothesis that *microdon* is a hybrid of *lanceolatum* with *Scolopendrium*, I made a sowing of mixed spores of the two species from wild plants. I have now a large crop of little seedlings showing their first and second fronds. Many of them are obviously *lanceolatum* and others equally clearly *Scolopendrium*, but there are many still indefinite in character, and it is possible that there may be one or more hybrids

* Since the above was written the little fern has sent up a new frond bearing the characteristic silvery scales of *Scolopendrium* on the stipes and under surface.

among them. It will not be until 1924 that most of them will be recognizable and even if there should be a hybrid among them it may not be *microdon*. We must wait and see. In the meantime I shall be glad to have news of any remaining plants of the original *microdon* should any still exist. I have recently made another sowing of spores (ten years old) of *microdon* supplied by Mr. H. Stansfield.

F.W.S.

STEM-BULBILS ON *OSMUNDA REGALIS*, VAR. *CRISTATA*, “SEEDLINGS.”

When in a young “seedling” stage, the stems of this plant appear to develop a number of peculiar “bulbil” growths—only one of the “buds” appearing on each stalk, as shewn in the illustration.

Where the bulbil arises, the stems form a strong bend or almost loop—in fact, the effect is nearly the same as if an actual “gall” distortion had taken place.

Only the youngest fronds are affected, and, as these mature and decay, the tiny plants root close to the parent plant. Eventually, the young progeny might easily be mistaken for a group of tiny offsets from the main plant.

So closely, in fact, do they nestle, that I find it difficult to believe they ever manage to survive as the central crown grows—unless here is another case of trading on the propagating habits of the beneficent pteridologist.

FRAS. W. THORRINGTON.

The Editor,

The British Fern Gazette.

THE CULTURE OF POLYPODIES.

A correspondent has asked me to describe my method of culture of the varieties of *Polypodium vulgare*, as he says “there is no doubt about the success of the Reading method.”

Now, there is nothing original about the "Reading method," and no claim is made for anything new in connection therewith. Others have doubtless used the same methods with equal results, but it is clear that not everyone is successful in their culture, so it may be worth while to describe the chief points to be observed in order to ensure success. The common *Polypody* is the most accommodating of ferns and one of the most difficult to kill by neglect. It is found growing upon the tops and sides of walls, the trunks of trees, the summits of pollards, upon dry banks and in accumulations of leaf-mould. It is, however, not found, and will not grow, in swampy places and the most certain method of killing a cultivated *Polypody* is to drown it. I put therefore as the first essential to its cultivation—*good drainage*; the soil may be moist, but it must not be wet for any long period. No fear need be entertained of giving a good drenching occasionally, but the water must be able to get away quickly. It is even advantageous for the soil, during the period of rest, to be rather dry although not dust dry. The period of most complete rest for *Polypodies*, apart from periods of severe frost, is probably the months of May and June. Growth does not begin as a rule until the end of June and it continues up to the middle of October or even later if the autumn be mild. The ferns are at their best during the autumn and winter months, *i.e.* from September to March. This brings us to another essential point in their culture, *viz.*, *shelter*. The species will live in the most exposed places, but will not grow to any size without shelter from wind and sun. If this be true of the normal form how much more so is it true of the noble leafy varieties such as the *Cambricum*, *pulcherrimum*, *omnilacerum* and the *semi-lacerum*? They cannot thrive if their great luxuriant fronds be broken by wind, snow and hail or by their being used as bedding by dogs, rats, cats, rabbits and birds. Unless the district be unusually favourable and the locality naturally sheltered,

therefore, some kind of house or frame is necessary to protect the fronds during the winter. In the Oxford Botanic Gardens *Polypodies* are grown in beds without any artificial covering, but they are well sheltered from winds by walls and hedges. They do remarkably well, but do not grow to anything like the proportions they can attain under glass. While giving shelter, however, it is necessary to avoid anything like close culture. If grown in a confined atmosphere the fronds will grow to a large size, but will be soft and pulpy, and will quickly decay. For this reason I prefer a frame with movable lights to a house, as in the former structure the lights can be either entirely removed in favourable weather or (preferably) they can be secured in a perpendicular position so as to admit air and rain. In my own case the lights are never entirely closed except in severe frost or violent storms, and during the summer and autumn months they are widely opened on the north side so as to give a certain amount of shade, but to admit a free circulation of air. The fronds produced under these conditions are thick and leathery and those of one year remain green until those of the next year are well developed. This persistence of the old fronds is sometimes rather a nuisance as the new ones have not proper room to develop. A period of comparative dryness before the new fronds appear seems to ripen the old ones and to facilitate their separation from the rhizomes.

Next as to soil. As before stated, the *Polypody* will live in almost any soil which is not too wet, and sometimes appears to grow without any soil, properly so-called, at all. It grows on bare walls and on the trunks of trees rooting either in the mortar of the walls or in the moss which, in moist districts, covers the bark of many trees. In these situations, however, it is invariably stunted and I have never seen it luxuriating unless it had a run of leaf-mould or peat for its roots. My friend, Mr. Henwood, who grows *Polypodies*, as he has done many other things, as well as anyone ever

did, has described his method of culture, especially with regard to soil, at p. 224, Vol. II., of *The Gazette*. For the benefit of new members I may say that the soil consists of about equal parts of turfy loam, fibrous peat, and oak leaf-mould with a slight sprinkling of bone meal. All these ingredients, however, are the *best of their kind* that can be procured at any price or with any trouble. The beds are top-dressed annually with a liberal quantity of leaf-mould and a slight sprinkling of bone meal. The fronds are kept free from green and white fly by being regularly sprayed with "Abol" as soon as these pests begin to appear. Lastly, with regard to lime. Is the *Polypody* a lime lover or a lime hater? It is certainly not the latter because it will grow in old mortar alone. On the other hand, it does not seem to require a large proportion of lime in the soil since there cannot be any large quantity of this mineral in beds of pure leaf-mould or in the moss on the trunks of trees. It is a fact, however, that it is rarely found luxuriating in a wild state except upon a calcareous soil and we may assume that it likes a calcareous flavour in its food. No doubt the leaf-mould contains an appreciable quantity of calcium salts, especially in a chalk or limestone district, and this may be sufficient for its requirements. A little chalk or lime rubble added to the soil, however, can do no harm and helps to keep the soil porous. The bone meal also supplies lime in a comparatively easily soluble form. Finally, the best *Polypodies* are worth any reasonable trouble to do them well and it has been well said that anything which is worth doing at all is worth doing well. Treat *Polypodies* well and the reward will be abundant.

F.W.S.

AMATEUR FERN GROWING.

(Reprinted from *Irish Gardening*.)

Any plant lover who has the misfortune to have to live in town, may derive more satisfaction, and therefore more pleasure, from the cultivation of ferns than from any other plants.

A fern house is the ideal condition, but not essential for success. We have known a fern lover and enthusiast who had, we believe, every British fern growing on the roof of his house, in the heart of London—he had not a yard of garden on the ground level, and no glass shelter on the roof garden.

As most town houses have some space behind, euphemistically called a garden, we will choose that as the site of our fernery, and decide that it is to be a fern house.

To attain success it will be necessary to think out the details beforehand of all the preparations to be made for the reception of plants, and carry out all these to completion before a single plant is bought. Many failures are due to first getting the plants and then trying to make a place for them.

Those who cannot afford a well-built greenhouse need not be discouraged. With a few loads of second-hand bricks the house can easily be run up, no glass being required except that for the roof, and a very satisfactory fernery is thus obtained. Better still, however, will be a well made greenhouse, which can be bought in sections from one of the several well-known firms who specialise in such things, and can be put up by oneself with the help of any handyman. If a wall sufficiently high is available, a “lean-to” house is recommended or, better still, a “ $\frac{3}{4}$ span,” as it gives head-room for the ferns on the back wall, which otherwise must be left bare, for a couple of feet, or else the ferns at the top grow against the roof and get distorted and discoloured by the moisture on the glass.

The steeper the slope of the roof the better, so as to carry off the moisture that condenses on the inside of the glass, for as the overlap of the panes gets clogged with dust, &c., the water does not run away on the outside of the lower pane, but tends to drop down on the plants below, causing havoc thereby. If making a fern-house again we would have a small slip of cardboard or rubber inserted at each side of the overlap, to keep the panes sufficiently apart, so as to carry off the condensed moisture, and to enable one, if the space became clogged, to clear it with a stiff brush. The overlap should be at least one inch.

The house should have a north aspect if at all possible. If not, choose anything but a south aspect. With a north aspect little, if any, shading will be required. With any other aspect shading will be necessary. Shading is a great bother, and, as in town there is so much soot and dust, one cannot have a permanent shading, for it becomes so dirty that it makes the house too dark. Most ferns like the light and grow towards it always ; it is the direct sunlight they object to, so with a north aspect shading is not required at all, though a little light shading from mid-May to mid-July is rather an advantage.

The ventilation arrangements are very important. On the front there should be at least two sashes which can be opened, one near each end. Additional opening sashes in each end are an advantage, as thus air can be admitted from whatever aspect is sheltered from the wind, for ferns dislike direct draught. Also there should be at least two ventilators in the roof, at its highest point, near each end.

If funds allow, all metal fittings, hinges, fastenings, &c., with their screws, should be of brass, as the constant damp soon rusts iron fittings, iron screws rot the wood, the hinges stiffen and burst off, &c.

No artificial heating should be installed. It becomes a nuisance, and we want our hobby to be only a pleasure. To

be constantly anxious about frost during autumn, winter and spring, leaves only two-thirds of the year for unmixed pleasure. To feel that one must go out on frosty nights to keep the fire going, no matter what engagement holds us, or what weariness or indisposition is over us, makes the heated greenhouse a real burden, a burden too we may not be able to bear ourselves, for the town dweller is often a busy person, whose duties may even necessitate frequent absence from home, thus he may have to rely on someone else to look after his hobby, which is neither fair to the person nor to the hobby. Put heating out of mind as an abomination, and cheer yourself with the thought that it is quite unnecessary. If you grow all the beautiful ferns which in no way require heat, you will need an enormous house and unlimited time on your hands.

The moment you decide to get a house, and before you do anything else, get together the materials for the ferns to grow in. One cannot expect good crops without well prepared ground, and the same applies to flowers, fruit or ferns. If you want them to grow well, you must give them good stuff to grow in and the kind they like. Get then a load of good fibrous loam—that is, sods, or “scraws,” as the country people call them, not more than 3 inches thick taken from old mountain pasture in a district free from limestone. These sods should then be carefully built, grass side down, into an oblong or square pile, by preference, against a wall, so as to get partial protection from heavy rain. They should remain thus till all the grass and other vegetation have died and decayed, which may take some months, hence the necessity of attacking this part of the preparations first of all. If you can leave it six months or more, all the better, for not only will the vegetation decay thoroughly, but obnoxious vermin, worms, beetles, &c., will die also, or else evacuate the territory—a most desirable condition.

Next get a load of mountain peat—not “turf,” such as we get in bogs and use for fuel—but sods from the mountain,

of brown fibrous peat, permeated probably with roots of bracken : the more fibrous it is the better. Treat it exactly in the same way as the loam.

Then get a load of leaf-mould and build it also into a compact square heap.

Finally, sand is a necessity. It is also a difficulty. "Silver sand" is the best, if you can afford it, but it is expensive. It can be obtained from garden supply firms by the hundred-weight, of various degrees of fineness or coarseness. Medium or coarse is perhaps the best when dealing with rockery work rather than pot plants. Sea sand should not be used—at least, that from the neighbourhood of Dublin, for even in the absence of shells, it contains so much limestone sand that it is quite unsuitable, in fact fatal, to many ferns. This is the reason why "silver sand" is so suitable, as it is lime free. A substitute for silver sand can be obtained at small cost, except the cost of personal labour. Get a load of "free-stone"—which is "rotten" or disintegrated granite, and so lime free—from the mountain: riddle this through a fine sieve. What does not run through is then pounded up and again riddled, and so on. An old horse-manger makes a capital mortar and an iron bar an efficient pestle. Excellent sharp, coarse and fine mixed, lime free sand is thus obtained for our purpose.

We have then obtained good material for our ferns to grow in. The preparation of it we will deal with later on, when the reason for the directions about making separate square or oblong heaps will be seen.

Incidentally, we may say that the coarser "free-stone" will come in as a most suitable constituent of our concrete cement floor.

(To be continued).

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(120, OXFORD ROAD, READING.)

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THE BRITISH FERN GAZETTE.

NEW SERIES.

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THE AUGUST MEETING, 1924.

As announced in our last issue the Annual Meeting of the Society will be held at Newcastle, Co. Down, North Ireland, on Monday, August 11th. Particulars as to place of meeting and information as to available accommodation will be sent later to members by circular. It has been pointed out that there are two Newcastles in Co. Down, but *our* Newcastle is close to the Mourne Mountains, under the shadow of Slieve Donard, and is connected with the world by a line of railway which the other Newcastle is not. Mr. R. Ll. Praeger has promised to attend the Meeting and, as he is familiar with the ground, will, as far as possible, conduct the excursions, thereby saving valuable time as members will be taken directly to the best places. We hope it may prove a happy hunting ground, and feel sure it will be a pleasant Meeting for those members who can arrange to be present.

OBITUARY: PRINCE ROLAND BONAPARTE.

We greatly regret to have to record the death, on April 14th, as announced in the daily press, of our member Prince Roland

Bonaparte, a grandson of Lucien Bonaparte, brother of the great Napoleon. He was one of the most eminent of French botanists and was also otherwise a great scientist and traveller, a member of the French Academy and President of the French Geographical Society. Although a comparatively recent accession to our Society his membership shed lustre upon it, and it is significant that his botanical enthusiasm was sufficiently catholic to embrace membership of a small and, to him, foreign band of specialists such as the British Pteridological Society. We mourn his loss in company with botanists generally and especially with those of France.

FERNS AND FLOWERS.

The ultra-specialist in any branch of gardening is apt to be a tiresome person to the outsider. He is too inclined to fill all his available space with his speciality, to his own edification perhaps, but in a way that is boring to other people. The keen rosarian, for instance, may fill his garden with roses and refuse to grow anything in between the trees. He will probably be apologetic when you notice the edging of violas or crocuses unwillingly planted at his wife's command. The fern enthusiast, too, I think, is a little inclined to fill his ground to the exclusion of everything else. But in spite of the wonderful diversity of form and size among our British ferns, and in spite of the fact that so many of them are beautiful the whole year round, I think the interest of an outdoor collection can be considerably increased by a judicious sprinkling of flowering plants. Ferns do not grow in nature in serried ranks, with bare patches of earth in between. In their natural haunts they are found in association with various wild flowers, and are not thought any the less attractive because of it. In the hedgerows they jostle with Herb Robert and speedwell, with primrose, buttercup, and stitchwort. Even the wall-loving spleenworts have to

rub shoulders with stone crop and pellitory, while in shady dells their root-stocks are often smothered in moss.

The enthusiast will, of course, consider carefully what he will allow to mix with his treasures. His first consideration will be to note what will flourish in such situations as are congenial to ferns. The flowers must be willing to grow and bloom in somewhat shady places and in fairly moist soil, besides which they must never be too obtrusive or in anyway a nuisance. The cultivator will thus dispense with periwinkle, St. John's Wort and such-like except for the roughest corners. The foliage must not compete with that of the ferns for light or space, and the flowers should preferably come when the ferns are past their best. Nor must the plants be possessed of too vigorous a root system, lest they deprive their neighbours of the necessary food and moisture.

The choice of suitable flowering plants is large, especially for the amateur with a small garden, who has to spread his collection beyond the strict limits of shade and into the sunnier parts. He has ample choice of bordering plants, should he desire such, and may choose violettas, dwarf campanulas, mossy saxifrages and many other things.

Among flowering plants for filling in odd spaces between the ferns themselves, few seem more suitable than the hardy *Cyclamen*, such as *C. coum* and *repandum* which bloom before the deciduous ferns have uncurled their new fronds, or *C. europeum* and *neapolitanum* which come along when the first glorious greenery of the ferns is on the wane. These cyclamen, I think, associate particularly well with the harts'-tongues, for both like a well drained soil not deficient in lime. For other spots, also well drained and not too shady, there are several of the *Crocus* species, beautiful and uncommon, which are worth trying even among the choicest ferns. *Crocus zonatus*, *medius*, *speciosus* and *longiflorus* suggest themselves for the autumn, with *C. Sieberi*, *biflorus* *Tomasinianus* and many others for the spring. The lesser

Narcissi, such as *triandrus*, *cyclamineus* and *bulbocodium* are all very choice and associate especially well with the smaller ferns on rockwork. Other bulbous and tuberous plants can be had in plenty, and the *Anemones*, such as *blanda*, *apennina* and *nemorosa* (in several varieties) call for special mention, as being beautiful, good natured and disappearing early. *Trillium grandiflorum* and *Sanguinaria canadensis* are two more, while mere mention will suffice in the case of *Adonis*, *Eranthis*, *Galanthus*, *Scilla*, *Muscari* and *Leucojum*. The old-fashioned Lily of the Valley enjoys the company of ferns, but is apt when happy to become a weed. *Fritillaria meleagris*, however, may hang its head, though not in shame, among your choicest shield ferns. No attempt at massing will be made in the fern border, a few flowers peeping out here and there in odd places being probably better, and detracting less from the main occupants of the beds. Here and there, a larger plant may be allowed, such as a clump of Christmas rose, a patch of *Anemone hepatica*, *Dodecatheon meadia*, or *Dicentra spectabilis*. *Mimulus* is somewhat too rampant, but *Mazus pumilio* is of a quieter habit. In the damper parts, too, such things as *Iris cristata* and *gracilipes*, *Cypripedium calceolus* and even some of the Gentians might be tried, while the height of enthusiasm will be reached when *Calochorti* of the *Globe* section are attempted in beds of leaf mould.

A host of other suitable things could be mentioned, but the object of this article is to give a few suggestions and not an exhaustive list. Some discretion must of course be used in placing whatever flowers we have decided upon, so that such moisture-loving things as the *Primulas* shall not be planted in the drier parts among the good-tempered male and shield ferns, nor such sun-loving plants as the Crocuses placed in the shadiest corners with the lady ferns. And this point will be conceded—only the choicest flowers among choice ferns : which statement can be supplemented

by another, that, on the whole, the so-called florists' flowers are out of place in the fern border, the natural species being altogether more suitable.

The above arrangement certainly adds to the interest of the visitor, who may never have heard of Moly, Jones, or Fox, and yet who might be persuaded to examine some fine ferns after having been attracted to the spot by a clump of *Epimedium* or a patch of *Primula rosea* in its full glory. Besides, it enables the fern lover with limited space to indulge his fancy in flowers without endangering the supremacy of his particular pets.

In conclusion, one might mention the question of carpeting. In nature, there is no doubt that the general plant association of wood and hedgerow tends to keep the roots cool, and in some cases to conserve moisture, but we do not want our choice ferns smothered and strangled by a rampant creeper. In an old volume of *The Gazette* it is suggested that the "Corsican nettle" (*Helxine Soleirolii*) might be used, but I imagine that this is too hearty a grower, at least for the less robust ferns, besides being doubtfully hardy. I am at present allowing *Mentha Requieni* and *Arenaria Balearica* to ramp over a small bed of mixed ferns, and am watching with interest for the result. I may be sorry for it later, but so far the apparent result is not bad. At any rate, nothing more suitable as a carpeter comes to mind, unless the dainty little annual *Ionopsidium acaule* can be called one. Perhaps someone in whose garden the *Arenaria* more especially is a weed, will give his experiences as to the fate of the ferns when the carpeter has taken possession and become thoroughly established.

S. P. ROWLANDS.

[There is nothing heretical in Dr. Rowlands' suggestion of mixing flowering plants (especially shade lovers) with ferns. We have long grown forms of *Anemone nemorosa* among our choicest ferns, e.g. *A. n. Robinsoniana*, Celestial and Blue Bonnet, as also some of the *Hepaticas* and a few dwarf and early daffodils. The *Anemones* flower before the ferns commence growth and by the time the ferns are fully occupying the ground the foliage, even, of the former has practically disappeared.

The Corsican nettle carpets the ground comfortably among the more robust-growing ferns, but is too overbearing for small-growing kinds. *Arenaria balearica* is better and is also prettier and neater. Other plants which may be suggested for association with ferns are snowdrops of various kinds (we have six), mossy saxifrages, *Epigæa repens* (for peat), *Nertera depressa* (in mild climates), *Adonis vernalis*, *Mimulus repens*, *Pyrola media*, *P. rotundifolia* and *P. minor*, *Smilacina bifolia*, etc.—*Editor.*]

A HARDY ADIANTUM.

We received last autumn from a friend, Captain Simpson-Hayward, a plant of an *Adiantum* which he collected in Kashmir, and which has proved quite hardy in mid-Gloucestershire for the past 15 years. It has been grown both in a cold house and also in the open air, on rockwork, without any protection except such as is afforded by the overhanging rockwork. In our own garden it has been kept in a cold house and has been frequently subjected to a temperature of 20 degrees F. Nevertheless, it has apparently not suffered in the least, the fronds remaining as green and fresh as when first received. About the end of January it began to make new growth, although all the British ferns were perfectly dormant. It has continued to grow slowly all through February in spite of the persistently cold weather with hard frosts almost every night. The new fronds are now (March 10th) one to two inches high, of a beautiful crimson colour, and look perfectly fresh and healthy. The fern has been identified by the Kew authorities as *A. venustum*, Don. It is however somewhat different from the plant which was in general cultivation under the name of "*venustum*" fifty years ago, although possibly not specifically so. It is obviously much hardier than *A. Capillus-Veneris* and probably almost as hardy as *A. pedatum* although an evergreen species. It is an elegant fern with wiry stems like *A. cuneatum*, but with rounder pinnules and with the rhizomatous habit of *A. Capillus-Veneris*. In previous years *Woodsia alpina* has commenced to grow in January and has several times been in full frondage by the middle of March. This year it is still

completely dormant in the second week in March, having been kept at rest by the cold weather. This is strong testimony to the hardy and adventurous character of the *Adiantum*. Another season we propose to try a bit of it out of doors in a sheltered place. Other species which are hardier than our native species are *A. Williamsii* (a "gold fern") and *A. Chiliense*, both evergreen. *A. pedatum* is as hardy as any of our British ferns, but is, of course, deciduous.

F.W.S.

SPECIES *v.* VARIETIES.

Botanically speaking, there should be considerable value in a list that might be compiled, for publication in *The Gazette*, of those ferns, now known to be *varieties* of British species, which have been classified originally as true species.

If Dr. Stansfield could be induced to speak with his unequalled authority on this subject, I fancy we should be surprised to find how often this has occurred.

I may instance a few cases as an illustration of my meaning : (1) The *Polypodium Cambricum* of Linnaeus' time, now our familiar *P. v. var. Cambricum*. (2) *Phegopteris plumosa* (J. Smith) for *Athyrium f.f. var. plumosum*, Horsfall. (3) The two forms of *Polypodium vulgare* from British Columbia, said to have been named as species, and, I presume, still known as such by the official botanists.

With regard to the last case, can it be definitely stated which specific names *are* attached to these two ferns ? If the names given were at all descriptive, it ought to be easy to discriminate between the two varieties, as one of them, I understand, is a "long-tailed" form, very suggestive of an approach to O'Kelly's *P. v. var. macrostachyon*.

The definite citation of "chapter and verse" concerning these two American ferns would certainly prove what has often been contended, that a revision of the names of exotic ferns is urgently required.

Such a revision should only be attempted by a skilled pteridologist, thoroughly acquainted with the marvellous range of variation in our British species. Moreover, the result is never likely to be attained until prolonged cultivation tests have been carried out by such an expert. All "doubtful" species, in the view of an authority with such experience, should be raised in fairly large numbers from spores. The mass of young plants from these sowings, growing under the supervision of a "seeing eye," would probably yield many solutions as to genealogy.

As genera where such a process of investigation into origins is extremely necessary, I mention specially *Adiantum*, *Asplenium*, *Polypodium* and *Pteris*. Every year that passes only proclaims more insistently the need for these critical cultures; and their bearing on the everlasting war of classification concerning *all* plants need not be emphasized.

FRAS. W. THORRINGTON.

The Editor,

The British Fern Gazette.

[We propose to deal with the question raised by Mr. Thorington in another number of the *Gazette*. It is much more complicated than at first sight would appear. The matter of species and varieties has been discussed at some length at pp. 159 and 178, Vol.III., of the *Gazette*.—*Editor*.]

ADIANTUM CAPILLUS-VENERIS.

This would probably be the most popular of all our native ferns but for its tender character. It is a child of the sunny south and cannot endure the climate of the bleak inhospitable north. It requires a winter temperature above freezing point, shelter from wind and a moderate amount of sun. A very vigorous and beautiful type is found in Natal, but the best variety is *magnificum* which often rivals *Ad. Farleyense* in extreme development. Other varieties are *Cornubiense*, *daphnites* and *fissum*. The varieties are quite as vigorous as the type, and all respond in no half-hearted

manner to the stimulus of a combination of heat, light and moisture. The writer has seen it on the outside walls of a warm greenhouse in Carnarvonshire, filling the crevices of the masonry just as we see *Asp. ruta-muraria*, but as the mean temperature in this county is too low the fronds barely projected beyond the level of the brickwork, being cut off and destroyed by the cold winds, but the roots and rhizomes being able to feel the influence of the internal heat were able to survive. M. Correvon mentions a beautiful legend in connection with this charming fern. It is as follows:—“Venus had black hair, of a lustrous ebony blackness. It is the botanist who says it, and as the gods have now disappeared it is difficult to contest the point. The fact is that the goddess has left upon earth some fragments of her hair, which nature has very properly not allowed to perish as would have been the case with ordinary hairs, but, taking root in the soil they have assumed the form of a plant! We see further that the goddess also lost her charming slippers which were transformed into a flower, *Cypripedium calceolus*. Its colour is a combination of gold and chocolate, the whole trimmed with silk in most exquisite fashion. The plant which bears the hairs of Venus is not common, although fairly well distributed in the regions of high Olympus which the gods frequented. It shows a special preference to the old walls of ruined temples in laughing Greece and in green Italy, clinging to the monuments of the past, and seeming to increase a hundredfold their grace and elegance with each year that passes.”

The combings and cast-off garments of the goddess having been turned to such satisfactory account, it is a matter for regret that the list of vestimental debris left on earth by the goddess is not a more extensive one.

H. STANSFIELD.

[We fear the variety *Cornubiense* of *A. Capillus-Veneris* has now disappeared. We cannot hear of it anywhere. It was the best of the lot.—*Editor.*]

THE " OXFORD VARIETY " OF POLYPODIUM V. OMNILACERUM.

This fern has now become pretty generally distributed among the members of the Society, and is also in the hands of several nurserymen. It was first noticed by the present writer in the Oxford Botanic Gardens, and a figure of it was published at p. 170, Vol. I., of *The Gazette* in June, 1911. On cultivation of the plant it soon appeared that it was quite a distinct plant from the *omnilacerum* of Moore found by Mr. Bennett in 1848. Not only is it much superior to the latter at its best, but it is a much more constant and reliable form, coming practically always true if well treated. It is also one of the two most robust-growing varieties of *P. vulgare*, producing fronds frequently 2 to 2½ feet in length and only rivalled in this respect by *P. v. semilacerum undulatum*. Unfortunately no information as to its origin could be obtained at Oxford, it having been in the gardens from before the time of the present curator, Mr. Baker, and no records being available as to whence it came. It has several times occurred to the Editor that the late Mr. Druery's description of *omnilacerum superbum*, Williams (Druery), in the " Book of British Ferns " (published about 1900), viz. : " A magnificent form, robust ; pinnules 2 inches long," fitted this fern remarkably well ; we saw a plant of this in Mr. Druery's garden some 20 years ago, but it was then in poor health and showed practically no character at all. Apparently Mr. Druery lost it, as our President, Mr. Cranfield, has not got it among the Druery collection of ferns which he acquired after Mr. Druery's death. In December, 1923, we received from Mrs. Thatcher, of Chew Magna, Somerset, a letter containing the following passage : " Since reading the interesting article in *The Gazette* on native *Polypodies* I am thinking that it may interest some fern growers to know that I have grown some varieties of the native *Polypody* (fronds of which I am sending) for about 15 years in the open on an old tree stump which was

planted on a border at the foot of a box hedge 12 feet high, facing north. The ferns were small pieces planted in a little leaf mould, loam and sand in the crevices of the stump ; nothing, except the removal annually of the dead fronds, has been done since. Ivy has grown over the surface and the ferns grow through it making a beautiful mass of greenery some four feet through each way. The ferns have had no lime, as the soil here is Red Sandstone ; they have been subjected to 16° F. of frost this winter, and in previous winters to as much as 23°. With the latter degrees of frost the fronds would be somewhat damaged." . . . The information contained in this letter is interesting on the point of culture, but the significant thing was that one of the fronds was obviously identical with the " Oxford " *omnilacerum*. On further inquiry we learnt that Mrs. Thatcher had received the fern about 20 years ago from a friend, Captain Pinwill, of Trehane, Cornwall, who at that time had a large stock of it. Captain Pinwill, now 93 years of age, could not remember when or how he had acquired the fern, but he had a strong impression that it was of Cornish origin. Remembering that *omnilacerum superbum* was from Cornwall, we appealed to Mr. J. C. Williams, of Caerheys Castle, whom we had always understood to be the finder of *superbum*, for further information about that fern. That gentleman, however, disclaimed all knowledge of it, and said he had often hunted for ferns, but had never found a *Polypody*, nor any other fern of importance. At the suggestion of Mr. Henwood we next wrote to Mr. P. D. Williams, of St. Keverne, on the subject. The latter gentleman, although then laid up with a fractured thigh in London, promptly replied, also disclaiming any responsibility for *superbum*, but offering some valuable suggestions which he thought might be the explanation of its origin. The late Mr. J. S. Tyerman, of Tregoney, was a very observant botanist and fond of ferns. About 1897, after Mr. Tyerman's

death, Mr. J. C. Williams bought his house and garden with the contents of the latter, and it was suggested that Mr. Tyerman was the finder of the fern—that Mr. J. C. Williams found the fern in his garden and sent a plant of it to Mr. Druery with whom he was in touch at the time. Mr. Druery erroneously attributed the plant to Mr. Williams, as the finder, and named it *omnilacerum superbum*, Williams. It is significant that “Captain Pinwill was a great friend of Mr. Tyerman, who shared most of his finds with him” (P.D.W.), and that is how the fern came to be in his possession more than 20 years ago. On this view being put to Mr. J. C. Williams he agreed that it was probably the correct one as he found many things in Mr. Tyerman’s garden and “most of my gardening friends then shared in the loot” (J.C.W.). Before he retired to Cornwall Mr. Tyerman was Curator of the Botanical Gardens at Liverpool, and it is probable that he, himself, sent plants of his find to other Botanical Gardens, including the Oxford one. Other inquiries have been made, but no further evidence has been collected.* We think, however, it is practically certain that *omnilacerum superbum* and the “Oxford Variety” are one and the same thing, and there is a strong case for the conclusion that Tyerman was the finder although this cannot be said to be actually demonstrated. Mr. Tyerman was an old friend of the Editor’s father and the writer, as a boy and a young man, knew him well, but lost touch with him some time after he retired to Cornwall.

F.W.S.

[* Mr. Cranfield has sent us Mr. Druery’s note book of his sowings of spores, in which we find a note “Nov. 22nd, 1899: a few spores of Williams’s *omnilacerum*”; a pinna of the fern is gummed in the book, and it quite corresponds in character with the Oxford var.]

THE MAIDENHAIR FERN.

The Maidenhair dreads winter cold,

Yet an Atlantic cliff will dare,
And in a cleft its fronds unfold.

The Maidenhair,
Well satisfied with frugal fare
Of long-accumulated mould,
Will glorify the crevice bare :
Secure in that precarious hold,
The wind its loveliness must spare
To be of every one extolled—

The Maidenhair.

FRAS. W. THORRINGTON.

THE FERNS OF THE LIZARD PENINSULA.

Circumstances took me to The Lizard in July, 1921. Although I had been to Penzance so long ago as 1875 I had never been to The Lizard itself, and I was glad to avail myself of the opportunity that presented itself. I thought perhaps that it might interest my fellow members if I gave a short account of my experiences amongst the ferns of that district. I was particularly anxious to find the *Asplenium lanceolatum*, which I had been informed by Messrs. Tresidder of Truro, as well as by other persons, was now almost extinct, if not quite so. A Mr. Jephson, of St. Germans, some years ago had sent me as a great rarity this fern, two very small plants—they did not long survive. I arrived one evening in July at Helston, but without my bicycle. This I had to wait an hour for, as it was not allowed to come by the Cornish Riviera express train, into which I had changed at Plymouth. Mounting my machine, I set out for the 11-mile run to The Lizard. On leaving Helston Station on my bicycle, the road is very steep to the centre of the town : a sharp turn to the left and a steep hill has to be ascended ; in about three-quarters of a mile you are

out of the town, and I notice in the hedges on either side of the road *Scolopendrium vulgare* in great profusion ; that fern accompanies you all the way to The Lizard. At about $3\frac{1}{2}$ miles *Polysticum angulare*, the soft shield, makes its appearance, and is very plentiful in all stages of growth. At the fourth milestone you descend a steep hill and notice on one side of the road many plants of *Asplenium Adiantum-nigrum*. At the bottom of the hill, in the garden of one of the houses, camellia trees, eucalyptus trees, yucca and palm trees are all growing in the garden, almost the first signs of the sub-tropical vegetation that afterwards became so general in the northern half of the Peninsula. Ascending the steep hill, in another mile you descend another steep hill, at the bottom of which you pass the entrance gate to the beautiful grounds of Bochym, and then ascend through the woods of the Bonython Plantations, composed of pine trees, rhododendrons, etc., which appeared to be full of ferns, principally, however, bracken. The soft shield fern which accompanied me as far as the bottom of the hill now entirely disappeared, and the road now enters on the bare and windswept Goonhilly Downs, that stretch all around to the sea. On both sides of the road *Asp. Adiantum-nigrum* is abundant, quite the prominent fern, and keeps so all the way to The Lizard ; in fact it abounds in every lane, except those *quite close* to the sea ; no matter what part of the coast I was exploring that particular fern always stopped short at about a quarter of a mile from the actual sea. These downs were one blaze of colour from the Cornish heath, dark red, light pink and white, but the full beauty was past. In the last two miles I noticed in the banks of the hedges a few plants of *Lastrea Filix-mas* and *Lastrea dilatata*. Although I constantly went along the road from The Lizard to Helston, I did not meet with any variation from the ordinary type of the ferns met with, except on one occasion when hunting about in the bottom of the hill at Bochym, I noticed, growing at the entrance

gate to a private house between two rocks, two fine plants of a beautiful crested lady fern. Seeing the gardener in the garden, I asked him if he could tell me how they got there, whether they had been planted there. He could not tell me more than that the rocks in question had been brought there from some neighbouring woods some years ago, and that these two ferns had made their appearance shortly after the rocks had been placed in position, and he had never seen any like them before or since. Soon after I had settled down I began exploring the coast-line for *Asplenium lanceolatum*, and especially on the west side, hunting in the caves and rocks as far as it was possible, but not a single plant did I meet with. *Asplenium marinum* was fairly common in some caves, but always out of reach. One of the caves at Pistol Cove was a very pretty sight, quite a natural fernery. I visited this cave several times just to look at *Asplenium marinum*. One day I rode to Falmouth, but owing to the Helford Estuary one has to come along the Helston Road for nine miles before one can turn off to Gweek, at which place there is a bridge over the river, and made my way to the Village of Constantine, situated on a hill, from which there are lovely views over the well-wooded Helford River and Estuary. On one side of the churchyard wall I came upon *Asplenium trichomanes* growing plentifully, but nowhere else in the village did I see it growing. Also, in the same wall, but at another point, were very stunted plants of *Asplenium Adiantum-nigrum*, and this fern crowded all the banks and stone walls right into Falmouth. My return journey was made through Penryn and a very hilly road to Helston. *Scolopendrium vulgare* and *Asplenium Adiantum-nigrum* were abundant. One day we all went to the picturesque fishing village of Coverack on the east side of the Peninsula, and went to Chynhalis Point, which stretches out some distance into the sea. Amongst the rocks I came upon some few plants of *Asplenium marinum* and a single

plant of what I thought at the time was *Asplenium Adiantum-nigrum*. I plucked a frond and put it in my guide book, and there it lay for some days. One day I was comparing various fronds for any difference and I remembered the frond I had got at Coverack. Placing it by the side of the others it was quite different, and on referring to Moore's Handbook it appeared to me to be very like to his illustration of *Asplenium lanceolatum*. I had spoken to several of the inhabitants of the village as to this fern, and one man, a serpentine worker by name of Francis C. Jose, told me that the fern was to be found amongst the rocks, low down, at Housel Bay Cove. I found Mr. Jose a most interesting man to talk to; his father had accompanied the late Mr. Johns when he spent a week at The Lizard. However, searching round Housel Bay failed to bring the fern into sight, when one day a man named Harris, employed at the Housel Bay Hotel, stopped me and said: "I hear you are interested in ferns and want to find *Asplenium lanceolatum*. It grows low down near the sea in cracks of the rocks, most difficult to get." He knew of one place where there were fine plants, but although they could be seen it was impossible to get at them. I may say that the cliffs all around this Lizard point are very high and very precipitous, and covered with a fine slippery turf, making them not easy to climb about. I had given up almost the hope of finding this fern, and turned my attention to the seeking of *Lastrea æmula*, always a favourite fern with me, but I had never been successful in keeping it alive for any length of time. I think I searched every lane around the Lizard and could not find it. In the woods between Bochym and Treloarwarren I had met with *Lastrea dilatata*, *Blechnum spicant*, both quite common, and occasional *Lastrea filix-mas* and a few *Athyrium filix-foemina*; along the hedgerows, *Scolopendrium vulgare*, *Polystichum augulare* and *Asplenium Adiantum-nigrum* in quantities. I had certainly thought I should meet with

L. æmula. One afternoon I started on my bicycle for the village of Manaccan, situated not far from the Helford Estuary; the guide book spoke of this village as being one of the most picturesque in the district. The first part of the way is across the wild Goonhilly Downs then the country becomes more woody and one notices yuccas, eucalyptus trees and fuchsias, and other sub-tropical plants growing in all the gardens. On passing through the little hamlet of New Town, I passed a house in the front garden of which abutilons were growing as big shrubs full of bloom, and a lady was training one plant against the wall of the house. I got into conversation with her, and I asked about the ferns of the district. She did not know much, but she had got two plants of a fern. She did not know the name, but had been told they were very rare and very valuable; would I like to see them? My hopes ran high; alas, they turned out to be the ordinary kind of *Asplenium trichomanes*, certainly a fern not at all common in The Lizard Peninsula—she used to live at Manaccan she said and I should find plenty of ferns there. I soon arrived at Manaccan, most quaintly situated on the banks of a stream flowing into the Helford River. Growing out of the tower of the church is a huge fig tree, which has been growing there for the last 160 years, and in the churchyard are many palm trees and the same sub-tropical plants. On the banks of the stream there were certainly heaps of ferns, and amongst them I came across a few plants of *Athyrium filix-fœmina*, but *Polys. angulare* was the most prominent. Leaving Manaccan by a different way, I went along a most lovely lane, the banks of which were also crowded with ferns, many *Lastrea dilatatas* being in evidence, when suddenly I saw *Lastrea æmula*; there is no mistaking this fern, and I was pleased to find it, but there were only a few plants of it, and curiously enough I did not meet with it again along that lane. I was nine miles from The Lizard by the shortest route, but I lengthened

my journey and it was dark before I got back. Just about this time I was lent "*A Week at The Lizard*," by the Rev. C. A. Johns, a most interesting little book, published many years ago, and now out of print. He mentions that *Asplenium lanceolatum* was to be found at Bass Point and the neighbourhood. Bass Point is a grand and, in places, precipitous headland with many detached pieces of rock. On this headland is stationed Lloyds' Signalling Station, and close to it but divided by a wide chasm is the equally grand headland called Penolver Point. As I was staying at a house almost situated on the very cliff itself and close to these two headlands, I determined to hunt every place I could get to. At first I met with no success, but at last, in a narrow crack in a rock, I noticed some fronds showing. The crack was so narrow I could not even get a frond out whole, and they seemed so stunted by the sun and wind. I continued my search about these rocks, but only came across a few plants in like places, and very soon passed from them—in fact it was just a little colony. I hunted all round Penolver Point itself, but not a plant was to be found, just a few *Asp. marinums* and those most stunted; but another time I was hunting around the Bass Point and met with it fairly frequently, but nearly always in these narrow cracks; but in one or two places I came upon it growing under large blocks of Hornblend rocks, and by the aid of a long narrow and thin stick I was able to procure some plants. Two things I began to notice about this fern were that it seemed to have a special liking for Hornblend, and that it grew in what one may term "colonies," and these colonies were very far apart and nearly always low down the cliffs, consequently unless really looked for it would not be seen. One afternoon I went to see Ruan Minor Church which has quite a different tower to those generally in the district, and I found growing in the wall of the school playground *Aspl. ruta-muraria*; this was the first and only time and place that I met with

this fern in The Lizard district. I had now met with the following ferns :—*Lastrea filix-mas*, *Lastrea pseudo-mas*, *Lastrea dilatata*, *Lastrea æmula*, *Polystichum angulare*, *Athyrium filix-fœmina*, *Asplenium ruta-muraria*, *Asplenium trichomanes*, *Asplenium marinum*, *Asplenium lanceolatum*, *Asplenium Adiantum-nigrum*, *Blechnum spicant*, *Pteris aquilina*, *Polypodium vulgare* and *Scolopendrium vulgare*. I now wanted to find the *Osmunda Regalis*. I had pretty well hunted in what I thought were all the most likely places, but without success. I had met with it in bicycling to Penzance, and it was not till February 11th that I came across it. I had several times spoken to Jose as to its whereabouts, and been to several of the places he mentioned, but without success. One day he said to me that he remembered his father saying to him that it was to be found on the Predannack Downs and gave me most minute directions as far as he could remember. I started early on 11th February and walked to the third milestone along the Helston Road, then took a rough road to the left which led on to the Downs. When I reached a cottage Jose said I would find a narrow rough lane close by, and there I should find the *Osmunda*; I found this track with a deep ditch on one side of it and many plants of *Blechnum spicant* growing, but not the sign of an *Osmunda*. On looking at my Ordnance Map I saw I was not far from Kimbro Pool. This I visited; all around it the ground was very marshy, but no signs of any *Osmunda*, but as the Ordnance Map showed a stream flowing out of the pool I thought I would follow it down. It took me some little time before I could fix on the right stream as there seemed several outlets from the pool; however, I found that they all joined together, and a current was running in what was now a deep ditch, the banks of which were thickly covered with gorse bushes and bushes of the wild sloe plum. I followed this stream down for some considerable distance, and was at last rewarded, for growing near the water at the side

bank was a fine clump ; it took me some considerable time before I was able to get off one crown. Following the stream I counted eight large clumps growing, and I dare say there might have been more, but the stream was so thickly overgrown it was quite impossible to see. I followed the stream for some considerable distance but did not meet with any further clumps, so struck across the downs to the coast and so back. Old Jose was very pleased that I had found it at last although not where he expected I should. With reference to *Asplenium lanceolatum* and the variety *microdon*, supposed to be a cross between *lanceolatum* and *marinum*, in all the small colonies of *lanceolatum* that I came across I never found a single plant of *marinum* growing with them. I now mention two things that I came across ; I was walking one day through some fields near Grade church, a good half-a-mile from the sea as the crow flies, and, examining a low bit of wall which was full of *Adiantum-nigrum*, I noticed three distinct clumps of *lanceolatum* growing with the *Adiantum-nigrum* ; there was no mistaking the fern. The other occasion was on the 15th February. I was returning from Penzance on my bicycle and had to walk up a very long hill, and as I had plenty of time I was examining the banks at the side of the road more closely than I had done before, when I came upon a batch of several plants of *lanceolatum* growing closely with *Adiantum-nigrum*. Although I searched all the way up this hill, which had quantities of *Adiantum-nigrum* and *Scolopendrium vulgare* growing on the banks, I never met with any more *lanceolatum*, and that spot was fully a mile away from the sea as the crow flies. I had been much disappointed in not finding any varieties during my stay at The Lizard, I can only put it down to my not being able to detect slight differences. The only variety I did meet with was on this very walk from Penzance, when I came across one plant of *Adiantum-nigrum* which had every frond divided twice at the tip, and one frond was twice

divided. I took this plant up, but on unpacking the ferns which I had brought back it was difficult to find the identical plant, the fronds being mostly broken off. I have planted it out with the other *Adiantum-nigrums* and the plants are just beginning to throw up new fronds, so I am hoping my variety will show itself again. I do not pretend that my fern hunting has in any way produced anything new, but it is just an account of my rambles in that interesting part of Cornwall known as The Lizard.

H. RELTON.

[During a fortnight spent in the Penzance district in 1922 we found *A. lanceolatum* widely distributed, but mostly in small colonies; in only one place was it found in anything like quantity. *L. æmula* was found in a few places but locally abundant. *Osmunda* was very difficult to discover and it was only by trespassing on private ground that we found it at all.—*Editor.*]

AMATEUR FERN GROWING.

(*Continued.*)

(Reprinted from *Irish Gardening.*)

Having selected the site, and got the house, the preparation for the reception of its guests begins. First examine the back wall, against which the house is placed, and cement up every hole and deep crevice in it, otherwise an army of snails and other vermin will march out every night to wage war on your succulent plants, and retreat to their safe quarters every day when you go to seek them in your wrath and indignation. Seal them up, to perish.

Next lay down a concrete floor over the whole interior surface, specially tight against the back wall, to exclude worms, with a slight slope from back to front, and a good deep, half-round gutter-groove running along the sides and front, sloping to one end. This should open outside into a trap, such as one has in areas for carrying off surface water, otherwise all kinds of pests will find their way up your water channel from the outside, even rats and mice; for all manner

of beasts, even humans, love to explore a hole, and though there is only one into your greenhouse, they will find it out. Besides, things you may wish to keep inside, which we will speak of later, will also explore the one and only hole, and, announcing the glad tidings to their friends, and even to their enemies, all will troop out as your enemies troop in, so trap it.

Next, we recommend that the house shall shelter a rockery and not pot plants, therefore no stages are required. Pot plants are a constant source of anxiety, and again, we are out for pleasure. If one is away for a day or two, or a week, the rockery looks after itself and takes no harm. The pot ferns, however, would all suffer, and some—the choice ones surely—would be as dead as Queen Anne. In the rockery it is wonderful how they will luxuriate in being left alone; for, at first, at least, they will probably suffer from over-kindness, drowned one day with water, smothered another day by heat, perished the next day with draughts. After a time experience and mutual forbearance will work wonders.

By this time our cement floor has set, and we have got two or three good coats of paint on all the woodwork.

The back wall is now our first care. It must eventually be covered with ferns, and usually they are given no chance at all in such a position. We cannot work at it well after the rockery is made, so it must be done first. Get enough wire (rabbit) netting of about one inch mesh to cover all that part of the wall to be left exposed by the rockery. We will suppose the wire netting is 3 feet wide. Now get some sods of turf such as are used for fuel. Select the softer brown kind, as even in shape as possible. Measure down from the *top* of the wall and mark on it the number of widths of wire that will be required. Then along the *lower* line of the last width, nail to the wall, with the largest wire-nail spikes, the turf sods, end to end, two nails in each, leaving about half an inch between each sod. Just before driving

home the nail, loop round the neck of it about 2 inches of copper wire. Make another line of sods in the same way along the line of the top of the lower width of netting. Now by means of the copper wire loops fix the *lower* edge of netting close to the turf sods. Next bound out the netting and cover it on the inside with moss, damped and pressed flat ; fill in prepared soil firmly as you proceed up till the space is filled to the next line of sods ; fasten the netting above with one turn of the copper wire, leaving the ends free. Make another line of sods at the next level ; fix the next width of wire at the bottom with the free ends of the copper wire which you have left, and then cut them short or double them in. Line this width of wire with moss, fill in the soil and fix as before, and so on till the wall is completely covered to the top—there it is *not* fixed to turf sods, but to nails driven into the wall direct. This requires a considerable quantity of soil, but it is worth it, as the ferns then have a good chance, and will take advantage of it. If, however, soil is a consideration and difficult to get, the space may be considerably reduced, and much soil saved, by cutting, with a fine-toothed saw, one-third off the thickness of each turf-sod. This is easily done. The reason of the lines of turf-sods will be obvious. They keep the netting a definite distance from the wall and give it a firm line of fixture ; each layer supports the soil above it, which is then not of such weight as to bulge out the wire netting and fall through it. The half-inch space between each sod allows water to trickle through and moisten the lower section. instead of running down the wall and leaving the lower section dry. Besides, the turf when thoroughly wet retains the moisture for a long time and saves the life of many a fern. By doing it in sections from below up, it can be done quite easily, whereas otherwise it would be almost impossible. As a matter of fact netting 2 feet or 2 feet 6 inches wide would be even better, and if desired, further support against

bulging can be made by fixing here and there along the middle of the space half a sod of turf, by one nail, with a copper wire loop, on the same principle as the lines were made.

Next, an arrangement must be made for watering this. Get an ordinary piece of lead gas pipe, sufficiently long to stretch the whole length of the house and down from roof to floor. Take a very small piercer, a shoemaker's awl is the best, and having closed one end by beating it up, gently pierce (so as not to dent) the gas pipe, every 3 inches for the length of the house, from the closed end. The holes must be very small and the intervals between them not too close, otherwise the pipe will not be capable of supplying them all, and the far end of the wall will get no water. Care must be taken to get all the holes in line on the pipe, and the best way to do this is to coil the pipe in a spiral on a flat surface and then pierce it as it lies. It is then put up in position with loops of copper wire, so that the jets from the holes will be directed into the soil at the top of the wire : this explains why no line of turf sods was made at the top. The water must on no account spurt out into the house, but must be directed right into the wire cutting, hence the necessity of making the holes in accurate line. The other end can be attached by a piece of rubber tube to the water tap, and so the whole back may be automatically and efficiently watered.

It is necessary to say something about the stones, or small rocks, which we are going to use. As many ferns do not thrive where lime is present, and others will be killed by even small traces of it, we must exclude limestone in all its forms from our rockery. This is a difficulty, for in many parts of the country it is the only stone to be obtained locally. Quite sufficient lime is dissolved out of the stones by the water we supply to the plants, to poison the surrounding soil

(To be continued).

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No. 4.

= The =

British Fern Gazette.

November, 1924.

EDITED BY

F. W. STANSFIELD, M.D.

(120, OXFORD ROAD, READING.)

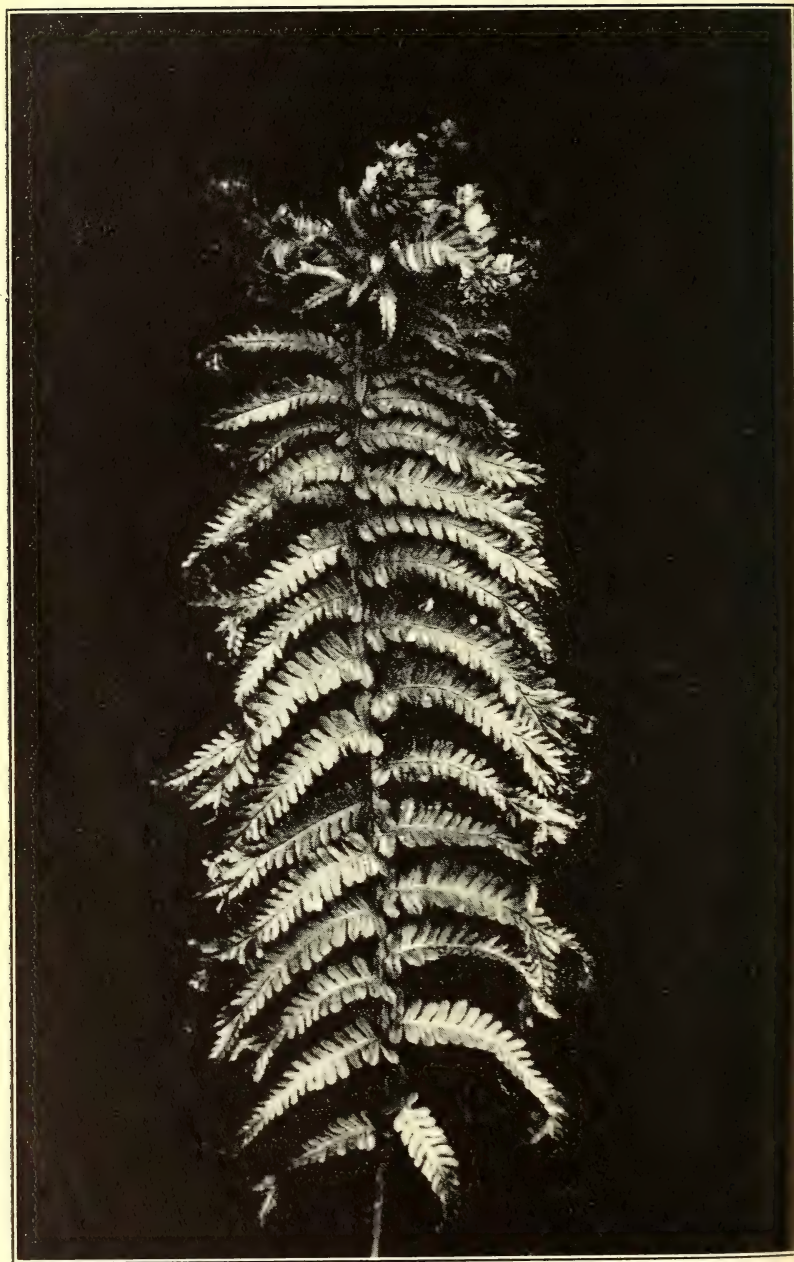
PUBLISHED BY

THE BRITISH PTERIDOLOGICAL SOCIETY

(President: Mr. W. B. Cranfield, East Lodge, Enfield Chase, Middlesex.)

(Hon. Secretary and Hon. Treasurer: Mr. Charles Henwood, 21, Clifton Road, Maida Vale, London, W.9.)

KENDAL, WESTMORLAND.



LASTREA FILIX-MAS GRANDICEPS, C. HENWOOD.

THE BRITISH FERN GAZETTE.

NEW SERIES.

VOL. V.

NOVEMBER, 1924.

No. 4

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EDITORIAL NOTES.

We learn from the daily press that two sons of our member, Mr. J. C. Williams (Lord Lieutenant of Cornwall), have been elected to the new Parliament, Commander Charles Williams being returned for the Torquay Division of Devonshire, and Mr. Alfred Williams for Launceston Division of Cornwall. We congratulate the Williams' family, the Society, and the country upon this result. It will be remembered that in a recent issue we referred to Mr. J. C. Williams as the primary introducer of *Polypodium v. omnilacerum superbum*.

We have received from Dr. S. P. Rowlands a plant of a very fine *cristatum* variety of *Asplenium trichomanes*, which has been found in the Dartmoor district by Mrs. Rowlands. It is very like the old *cristatum* of Moore, but may turn out, when fully developed, to be an even finer thing. It does not appear to have any tendency to the depauperation which some crested forms have shown.

Our President, Mr. W. B. Cranfield, exhibited, at the R.H.S. Show on November 4th, a fine group of choice British ferns, including *Polystichum angulare pulcherrimum*, Cranfield (a new seedling); *P.a. divisilobum falcatum*, No. 1; *P. a. divisilobum plumosum*, Esplan; *P.a. divisilobum plumosum Baldwinii* seedling; *P.a. nitescens grande*, Cranfield; *P.a. grandiceps*, Rousdon var.; *P. aculeatum gracillimum*, Cranfield; *P. ac. pulcherrimum*, Druery; *Scolopendrium v. crispum fimbriatum rugosum*; and many other exceedingly fine things. He received awards of merit for *P.a. falcatum*, No. 1, and *P. ang. divisilobum laxum*, and a silver-gilt Banksian medal for the group. These awards cannot be said to err on the side of generosity for certainly greater honours have often been shown to exhibits of much less outstanding quality. We congratulate Mr. Cranfield on his enterprise which, we trust, may lead to a greater interest being taken by the public and the horticultural fraternity in this class of plants, now so rarely seen in first-class form at exhibitions in this country.

THE AUGUST MEETING.

The Annual Meeting of the Society was held on Monday, August 11th, at the George Hotel, Axminster, it having been found impossible to secure suitable accommodation in or near Newcastle, Co. Down. This was, no doubt, a disappointment to some members, but Axminster proved an excellent second choice for, although the district was visited in 1923, the dry weather in that year made fern hunting a difficult and unsatisfactory pursuit. This year the whole country seemed transformed by the abundant rainfall, and the ferns, in particular, were luxuriant and beautiful. The choice of Axminster was justified by the result as, notwithstanding the late notice of the place of meeting, a fair number of members attended from London, Enfield, Great Bookham, Horsham, Reading, etc. One member came from Ireland (Co. Dublin) and a second was only prevented by his inability

to secure a berth in a steamer from Belfast. The President, Mr. W. B. Cranfield, occupied the Chair at the Meeting.

Most of the old officers were re-elected, the exception being Mr. Smithies, who wished to give up the position of Auditor, which he had ably filled since the formation of the Society. Mr. Sheldon, of Great Bookham, was elected Auditor, and as it was considered that this office would disqualify him from acting on the Committee, his name was transferred to the list of Vice-Presidents. We print below a complete list of Officers and Committee.

The Rev. Canon Kingsmill Moore exhibited fronds of two varieties of *Polystichum angulare*, found in Ireland, which had not previously been brought to the notice of the Society. One, found in Co. Wicklow in 1910 by Miss Vera Symes, was a neat *crispatum* or *congestum* in the way of the *crispatum* found by the late Colonel A. M. Jones at Hale, near Salisbury. The other, found also in Co. Wicklow by Mrs. F. Jones in 1896, was a dwarf *grandidens*, good of its kind, but still—only a *grandidens*.

Mr. T. E. Henwood exhibited fronds of a number of fine varieties including *P. angulare divisilobum*, Bland, *Lastrea filix-mas grandiceps*, found on Norwich Cathedral by Mr. C. Henwood, *P. angulare congestum perserratum*, a very neat new cross, which he had received from Messrs. Perry, of Enfield. This last is one of the most beautiful congested forms either found or raised. Unlike most cross-bred ferns it seems quite stable in character and does not fluctuate between the two parents. The Certificate of the Society was deservedly awarded to Messrs. Perry for this new fern. Mr. C. Henwood was also awarded a Certificate for his *grandiceps* find, which is distinct from other forms of *grandiceps*, although, of course, on the same lines. The terminal crested head is very "mossy" and the lateral crests give the pinnæ a peculiar pendulous grace. It is free from the depauperation which is so often found in varieties of this species and which

detracts so much from the beauty of some of the crested forms. Other varieties shown by Mr. Henwood were *P. angulare divisilobum*, Bland, *P. acul. gracillimum attenuatum*, F.W.S., *Polypodium v. omnilacerum superbum*, *P. v. Cambricum*, C. Henwood.

Dr. Stansfield exhibited a number of fronds, including *P. aculeatum pulcherrimum plumosum*, Green, in very fine form, and Mr. Burton's *Lastrea filix-mas cristata*, found a year or two ago in Kent. This variety improves under cultivation and is tending to become a *percristatum*. It is not quite free from the vice of depauperation, but it is hoped that this tendency will disappear from a thoroughly established plant. Other varieties shown were *P. angulare brachiatum*, F.W.S., found at Totnes in 1913, *P.a. divisilobum*, T. Stansfield, found at Chideock in 1921, *P.a. pluma Cygni*, *pluma Paradiseæ* and *pluma Ardeæ*, seedlings of the *rarefactum* strain. Also Forster's *Blechnum sp. plumosum*, of which some fronds had taken on the character of *serratum*, Airey No. 2, while others remained true to the original character.

A discussion took place as to the place of meeting for 1925, a desire for a locality in Ireland being again manifested. Rostrevor was suggested as a convenient centre for the Mourne Mountains and eventually the matter was left in the hands of a Sub-Committee consisting of the President, Hon. Secretary and Editor. The President said he was shortly visiting this part of Ireland and would make investigations on the spot as to the best base of operations.

The party spent a pleasant and interesting week at Axminster and found the hunting much more profitable than in 1923. The principal honours of the chase fell to the senior member of the party, Mr. T. E. Henwood, who found no fewer than three crested *angulares*, two of them of the first-class, while the third was a mere *multifidum* or *furcillatum*. The same hunter also found a very neat *angulare*

congestum, this being in the same lane where a similar one was found by Dr. T. Stansfield in 1921. Other finds of less importance were made by the same and other members, e.g., a fine multifid, but not quite constant, form of *Asplenium trichomanes* was found in several places and by several members, a sub-bipinnate form of the same species by Mr. Sheldon ; *A. Adiantum-nigrum* was found very highly developed and in some cases approaching *A. Ad-nigrum acutum* (Bory), but not quite reaching the extremely divided type for which specific rank has been claimed ; a couple of humdrum acutilobes in *angulare* and a couple of multilobes ; also one or two other possibly crested *angulares*, but so greatly mutilated by the hedge-cutters that their exact value could not be determined at the time. Species not seen in 1923 were *Lastrea montana*, *Ceterach officinarum*, and *Cystopteris fragilis*, the last at Hawkchurch, the former residence and the burial place of the late Mr. Moly, whose grave was seen in the village churchyard.

The hospitality of Mrs. Franks and her staff made the George Hotel a "home from home."

OFFICERS FOR 1924-25.

President :

Mr. W. B. Cranfield.

Vice-Presidents :

Mr. A. Cowan,	Mr. J. J. Smithies,
Dr. F. W. Stansfield,	Mr. T. E. Henwood,
Rev. Canon H. Kingsmill	Mr. G. E. Stephens,
Moore,	Mr. J. J. Sheldon.

Committee :

Mr. R. Whiteside,	Mrs. Groves,
Mr. W. Wilson,	Mr. J. Edwards,
Mr. H. Relton,	Mr. P. Greenfield.

Hon. Secretary and Treasurer :

Mr. C. Henwood.

Editor :

Dr. F. W. Stansfield.

Auditor :

Mr. J. J. Sheldon.

THE BRITISH PTERIDOLOGICAL SOCIETY.

BALANCE SHEET, 1924.

INCOME.		EXPENDITURE.	
1924.	£ s. d.	1924.	£ s. d.
To Balance at Bank from 1923	... 21 19 4	By Paid Affiliation Fee R.H.S.	... 2 2 0
„ Subscriptions	... 26 10 0	„ Paid for October " Gazettes "	... 12 2 6
„ Sale of " Gazette "	... 2 6	„ Paid for June " Gazettes "	... 10 15 0
„ Advertisement	... 2 2 0	„ Printing, Stationery and Postages	
„ Interest—2/10, 3/3	... 6 1	by the Secretary	... 4 9 0
		„ Commission	... 6
		„ Balance at Bank	... 21 10 11
	<u>£50 19 11</u>		<u>£50 19 11</u>

Examined and found correct this 9th day of December, 1924.

JAMES J. SMITHIES, *Auditor.*

OUR FRONTISPIECE.

LASTREA FILIX-MAS GRANDICEPS, C. HENWOOD.

This very handsome fern was found by our Hon. Secretary a few years ago as a tiny plant growing upon the wall of Norwich Cathedral. It is the second good thing found by the same hunter in ecclesiastical precincts, his *Blechnum sp. serratum* having been found on a churchyard wall in Buckinghamshire. The *grandiceps* is in the way of previous finds of this variety, but differs in the more mossy crest and the pendulous pinnæ (see report of the August Meeting in this issue). It seems to be quite free from "roguishness" and will doubtless be a useful garden fern as *filix-mas* is our most enduring and accommodating species. We are indebted to the finder for the photograph as also for a plant.

OBITUARY.

WHITWELL.

It is with the deepest regret that we record the death, on June 17th, of our old member and friend, Mr. George Whitwell, of Kendal, in his 85th year, one of the founders of the Society, and for many years its esteemed Hon. Secretary. Although in humble circumstances, and with no pretensions to culture or literary attainments, he was, in all essential respects, a gentleman of the first quality—truthful, honourable and kindly. He had a keen sense of humour and a large fund of anecdotes of the countryside and its inhabitants. An all-round naturalist of no mean character, he was a keen botanist, but his greatest love was for British ferns and their variations. Of these, he possessed an extensive and choice collection, largely consisting of original finds, especially of those in the Lake District. Of these last, he had probably a more intimate knowledge than any other man up to the time of his death. He never condescended to make a trade

of his hobby, but was content with the pleasure of tending and developing his pet plants and of giving duplicates to his friends. It was his greatest pleasure to give a spare plant of a good thing to anyone who could appreciate it and, as a natural consequence, anyone who had anything good in the fern line was always glad to "give a bit to Whitwell." The writer has received many valuable ferns from him, but always as free gifts; never as the result of any kind of bargain and certainly never for any consideration of "filthy lucre." As he was a constant hunter and a resident in a ferny district his finds were numerous and often very good. His own record of these, published in *The Gazette* of December, 1909, contains 61 varieties, 26 of which were *montanas*. His best *montanas* were probably his *angustifrons*, *congesta* and *plumosa*, all very fine things, but, while *angustifrons* and *plumosa* have been closely paralleled by others, his *congesta* remains unique, being by far the most vigorous and dense, as well as the largest grower, of this section. His most remarkable find of all, however, was his *Blechnum* *sp. paradoxum*, the history of which is related in *The Gazette*, Vol. III., page 263, as well as in Mr. Whitwell's own record, as above stated. This fern was absolutely unique, not only among *Blechnums*, but among ferns, nothing else like it having been found in any species. It was a cause of great grief to the finder and to other fern-lovers when this curiosity eventually became extinct. We are glad to learn that our past President, Mr. Alexander Cowan, has arranged to purchase a large proportion of Mr. Whitwell's collection, including the *Blechnums*, the *Lastrea montana* varieties and the *Polypodies*, as this will ensure the valuable series of original finds in these species being still available for reference and comparison in the hands of an eminent and influential member of the Society.

Mr. Whitwell's death has caused a great gap in the Society as there are now very few remaining of the band of Lake

District fern-growers who formed the nucleus of the Society. Those who knew him will always remember his quiet and unassuming manner and his quaint and interesting personality. It is well for us to have known such a man. Our sympathy goes out to the daughter who is the only surviving member of his immediate family.

F.W.S.

EDWARDS.

With profound regret also we chronicle the death of another very old and valued member of the Society, Mr. Joe Edwards, of Moston, Manchester, in his 70th year. He died quite suddenly and before medical assistance could be obtained. Mr. H. Stansfield, of Sale, whose nearest fern neighbour he was, has sent us the following contribution to his memory.

“Mr. Edwards was born near Bristol and came to the North when about twenty years of age. He was originally a joiner by trade, but eventually took service under the Manchester Corporation as Inspector of Buildings. This office he held for twenty-four years, when he retired on his pension, but only enjoyed it for about eighteen months. He was a very well-read man, possessed of immense energy, and seemed to succeed in everything he took in hand. His private garden was a wonderful example of what an energetic man can accomplish in his spare time. He was an enthusiastic grower of Carnations, Picotees and Auriculas, and had a collection of all the best-named kinds as well as thousands of seedlings, the results of his own crossing and raising. His rock garden, planted with choice alpiners, was a monument to his energy and good taste. His collection of caeti and succulent plants was a very choice and extensive one. He also devoted a portion of his garden to the production of vegetables for home consumption and his house of tomatoes bears silent witness to his industry and intelligent culture. Ferns were, however, his chief hobby and his collection was one of the most interesting and extensive in the Manchester

district. His *Blechnums* and *Polypodies* were exceptionally fine and his cultures of aposporous subjects were a most interesting feature in his fernery. He was an enthusiastic microscopist and flautist. His most noticeable quality, however, was his cheerful, genial and optimistic disposition. His very presence brought with it a feeling of contentment and happiness like a breath from Arabia Felix and the writer feels that he has lost a very dear friend."

Mr. Edwards leaves a wife, a son and a daughter, the wife and daughter both in delicate health. He was a member of the Committee and a regular attender at our meetings, where his cheerful and genial personality will be much missed. We understand that his collections of ferns and other plants are for sale.

POLYSTICHUM ANGULARE PLUMOSISSIMUM AND P.A. PELLUCIDUM.

These forms have been previously mentioned on p. 11, Vol. II. of *The Gazette*, i.e. twelve years ago. The time has now arrived when they can be more correctly described and their correct place more definitely settled. Both are developments of the plumose-divisilobe strain and they are very closely allied to each other. *Plumosissimum* has prothalloid tips to all the segments and, when grown in a close atmosphere, these are capable of development into true apospory. In *pellucidum*, however, the frond in the young state is translucent all through except the stems and stemlets. If grown on in the open air, or in a well-ventilated frame or house, the pellucid character and aposporous tips both disappear as the plant approaches maturity and the plants of both sections gradually develop into plumose divisilobes of an exceedingly high character. They are exceptionally foliose as well as exquisitely divided and many of them are Todea-like in cutting although no longer pellucid in texture. Under cultivation the difficulty is the transition stage from the

translucent to the opaque condition. If kept too long in a close atmosphere the aposporous condition is maintained, but the plants lose vigour and sometimes die or "go blind" quite suddenly. The best plan is to get them established in the open air during a spell of moist weather. The open air acts as a tonic and stimulates root formation while the fronds take on a thicker and more opaque texture and the plants acquire greater stamina and vigour. Many plants have been lost by too much coddling as was the original plant of Birkenhead's *plumosissimum*. The surviving plants of this form have all been raised by apospory. The original batch of "pellucidum" contained some seven or eight plants, all differing slightly in detail, although having a close family resemblance. Most of these still survive in the collections of Mr. Cranfield, Mr. Henwood, Mr. Edwards and Dr. Stansfield (the writer has seven). Many plants (bulbils) have been given away, but it is feared that many of them have died either through too much coddling or in too abrupt an attempted transition from the pellucid to the opaque stage of existence. It is probable that *pellucidums* can be raised from almost any one of the Jones-Fox strain of plumose-divisilobes when these are fertile. It is necessary, however, to raise a considerable batch of seedlings and to pick out the best. These can be recognised in a very early stage, not only by their translucent appearance, but by the curly character of the very first fronds. If the terms *plumosissimum* and *pellucidum* be retained it should be recognized that these terms merely apply to a stage in the life-history of the plants and are not permanent characteristics. It would, perhaps, be best to drop the terms altogether and to class these ferns among the plumose-divisilobes to which they belong when fully developed.

ASPLENIUM LANCEOLATUM MICRODON AND A. AD. NIGRUM MICRODON.

Mr. T. Leighton, of S. Hamilton Place, Kilmarnock, writes us, on date July 24th, 1924, that he has adopted our suggestion

in No. 7, Vol. 4 of *The Gazette*, and has sown freshly ripened spores of *A. Adiantum-nigrum*, *A. lanceolatum*, *A. trichomanes* and *A. marinum* in separate pans, but mixed in each case with spores of *Scolopendrium vulgare*. The spores have now developed into plants from one to two inches high, but, so far, nothing has appeared at all different from the species sown. Mr. Leighton intends to try the experiment again and hopes for better results. We congratulate him on his enterprise, which, we hope, may be emulated by others.

Our own experiment of sowing together *A. lanceolatum* and *Scolopendrium vulgare* (made in October, 1922) has also had a negative result for, although the spores germinated freely and simultaneously, nothing of the nature of a hybrid has resulted. Many of the *Scolopendrium* seedlings, however, had their primary fronds pinnatifid, and some even pinnate, raising hopes which were all disappointed. Indeed, so general was this phenomenon that the idea is suggested that *Scolopendrium* is descended from a pinnate-fronded fern and tends to hark back to this character in the young state, just as the human embryo in an early stage, has gill-slits like a fish and a circulation like a frog. We have now made the further experiment of sowing together the spores of *A. marinum* and *A. lanceolatum* in order to test the theory of Lowe and Wollaston that *microdon* is a hybrid between these two species. Of course, a negative result in either case proves nothing and is only what can be expected in the majority of trials. A positive result, however, may eventually occur and, in that case, will be decisive. Our sowing of *A. lanceolatum microdon*, made in 1917, has resulted in nothing more than the production of a few miserable little bastard *Scolopendriums*, most of which died before they were out of babyhood, in spite of the most sedulous nursing. In August, 1923, we made another sowing of *microdon* (very old spores) with, as a result, a thin crop of prothalli, some of which are now sending up fronds. Most of these are

obviously strays, being mainly *Lastreas*, but there is one which is certainly an *Asplenium* and probably either *lanceolatum* or *Ad. nigrum*. In 1923 we also sowed spores of Mr. H. Stansfield's *A. Ad. nigrum subconfluens*, found at Killarney in 1912, a variety which somewhat resembles *A. Ad. nigrum microdon*, but is abundantly fertile. It will be interesting to see whether anything more closely approximating to *microdon* will appear among the seedlings which are now just pricked off.

F.W.S.

POLYPODIUM V. OMNILACERUM SUPERBUM AGAIN.

We have received from Mr. R. Hawkins, of Whitegate, Co. Cork (brother of an esteemed member, Canon E. H. Hawkins), a plant of an *omnilacerum*, which is undistinguishable from the "Oxford" variety, *o. superbum* of Druery. Mr. Hawkins found this fern near his home seven or eight years ago, when it was considered to be a superior form of *semilacerum*. The finder had, at that time, never seen an *omnilacerum* at all, not to mention a *superbum*. He planted the fern on his rockery, where it has been kept under continuous observation by himself and his sister, Miss Hawkins. It has gradually improved under cultivation and he has since received the "Oxford" variety and recognizes the practical identity of the two forms. Both Mr. and Miss Hawkins are positive that there has been no confusion between the two plants, which have been kept in quite different parts of the garden since the "Oxford" variety was acquired. It is, to say the least, a very singular coincidence that this form, the origin of which is at present obscure, should crop up again in County Cork as a wild plant. Mr. Hawkins is to be congratulated on his find, which is one of the most remarkable in the history of this species, prolific as it has been in fine varieties. We shall study the behaviour of *omnilacerum superbum*, Hawkins, and watch caerfully for any points of difference from the "Oxford" variety. At present none is discernible although we have well developed plants of both.

SPECIES AND VARIETIES.

Referring to Mr. Thorrington's letter in our last issue of *The Gazette*, there is not a great number of British ferns which have been described as species, but are now regarded only as varieties. Mr. Thorrington himself mentions two of the most striking examples, viz., *Polypodium v. Cambricum* and *Athyrium f.f. plumosum*, Horsfall. *Asplenium lanceolatum microdon* was referred to by Moore as probably a distinct species after it had been classed as a variety of *A. marinum*. The exact status of this fern is even now not finally settled, although it is pretty generally regarded as a hybrid. The same is true of *Lastrea remota*. Lowe, in "Our Native Ferns," says of this plant: "To Mr. Thomas Moore, of the Chelsea Botanic Gardens, we are indebted for bringing the present species before the public. This well-known authority on ferns received fronds from Mr. Clowes and recognized in them the *Aspidium remotum* of Braun, announcing the discovery to the Linnaean Society on the 15th of December, 1859. Thus another *species* has been added to our British ferns." *L. remota* is now almost universally regarded as a hybrid, the parents being believed to be *L. filix-mas* and *L. spinulosa*. Then several forms of *L. dilatata* have been described as species, e.g., *dumetorum* (Smith), *Polystichum tanacetifolium* (Hoffmann, endorsed by Lamarck and De Candolle); *Lastrea collina*, Newman, is the same thing if, indeed, it be anything more than a state of *dilatata* (see *L. dilatata* and its allies, *The Gazette*, Vol. III., p. 104). *L. maculata*, Deakin, and *L. glandulosa*, Newman, are others. In these days we are very doubtful about all these even as varieties. The same is true about *Athyrium*, of which Hoffmann and Roth each made five species, none of which we now regard even as decent varieties. *Cystopteris fragilis* was also split up into three species by Sir J. E. Smith, viz., *cystea dentata*, *C. fragilis*, and *C. angustata*, none of which now stand as species, but simply as slightly more or slightly less divided forms of *C. fragilis*.

Roth also described *C. authriscifolia* and *C. cynapifolia*, which are also slightly more divided forms of *C. fragilis*. On the other hand, *C. Dickieana*, Sim, which has really a much greater claim to be called a species, if mentioned at all, is referred to only as a variety. The Editor of the new edition of "Babington's Manual" says, however, that he has "placed this and *C. Alpina* under one species (*C. fragilis*) with much doubt." Adverting to the two American *Polypodies*, sent to the late Mr. Druery some years ago by Mr. Geo. Fraser, of Ucluelet, B.C., these have become known for convenience as var. *acuminatum* and var. *longicaudatum*; the latter is a close copy in outline of O'Kelly's variety *macrostachyon*, while *acuminatum* is more like the var. *acutum* *Stansfieldii* figured in Lowe's "Our Native Ferns." They both differ, however, from *P. vulgare* in a certain softness of texture with a very fine and almost invisible pubescence by which they can be distinguished in the dark from any of the British forms of *P. vulgare*. We learn from Mr. C. H. Wright the fern expert of the Kew herbarium, that the fern we have called *acuminatum* is *Polypodium glycyrrhiza*, D. C. Eaton, "American Journal of Science," Vol. 7., p. 138 (1856), to which belong the following synonyms:—*P. falcatum*, Kellogg, *P. occidentale*, Maxon and *P. vulgare* var. *occidentale*, Hooker. "It is distinguished from *P. vulgare* by the long acuminate pinnules" (? pinnæ, F.W.S.). The long-tail form is regarded as an extreme form of *P. glycyrrhiza*. Seeing that botanists are not agreed upon what constitutes a species it is mere beating of the air to discuss the question of species or varieties for these forms. Our own view would be to regard them as varieties of a geographical sub-species (distinguished by the velvety surface) which is the western representative of our *P. vulgare*.

TESTACELLA HALIOTIDEA: A CARNIVOROUS SLUG.

It were well that gardeners, and perhaps especially fern-growers, should know that all slugs and snails are not vermin.

The *Testacella* was recorded in 1801 from Guernsey, but was afterwards found in a garden at Lambeth. Captain Thomas Brown, writing in 1845, considered it to be an indigenous British and Irish species. It resembles, at first sight, a small specimen of *Limax flavus* or a large one of *L. agrestis*, both very common and destructive slugs, but it can at once be distinguished from these and other vegetarian slugs by a small shield-shaped flat shell, like the flat valve of a tiny oyster, close to its hinder extremity. This rudimentary shell does not seem to serve any particular purpose in the life-history of the mollusc, but is probably merely evidence of its descent from a shell-bearing ancestor. On closer examination the *Testacella* will be found to be less slimy than other slugs and it is also peculiar in being slender near its head and thicker near the tail. When the animal lays its eggs these are extruded from an aperture, close to the head, on its under surface. It lives largely on earthworms, but will also eat ordinary slugs and other small deer. It spends most of its life under ground and comes to the surface chiefly at night and especially during the summer and autumn months. It is eminently adapted for hunting the larvae of *Otiorrhynchus* and, if encouraged, may be a valuable check against that worst of all fern vermin. If *Testacellas* could be trained like foxhounds and otter-hounds to make a speciality of fern weevil larvae they might be worth breeding on a large scale. It is a far cry from sporting dogs to sporting slugs, but if fleas can be trained to work for their living, why not slugs? In any case, it will be wise for gardeners to look out for and preserve *Testacellas* instead of killing them. It would not be difficult to confine a *Testacella* or two along with a number of weevil larvae in earth in order to find out whether the grubs are really eaten. The late Mr. S. Cropper encouraged shrews in his fernery as weevil hunters, but we would prefer *Testacellas* as being at least equally useful and certainly much less mischievous.

PSYCHO-PTERIDOLOGY.

In opening this subject, I am compelled for some space to deal in generalities, so I must ask the kindly indulgence of fernists if I seem "long-winded" in arriving at the point.

Several times, amongst the gardening fraternity, I have found an impression that there exist certain people who are able to obtain better results in plant-growing than can be managed by the generality of culturists. One hears some such remark as this: "Oh, you know So-and-So, *he* only has to stick a thing in the ground and it's sure to grow."

A similar idea may be traced regarding the wearing of flowers as a "button-hole," or the carrying of a bouquet. Here, it is stated, sundry individuals appear to possess the faculty of keeping the flowers fresh and in good condition much longer than is usual.

From these rather nebulous instances, I will pass to a much better authenticated one—the strange selective powers which are apparently used by Luther Burbank in raising new varieties of plants. It is stated, although I admit it sounds highly incredible, that from a field of many thousands of seedling fruit-trees, which look all alike to the ordinary eye, Burbank will unerringly select two or three plants for growing on, and have all the remainder destroyed.

Doubtless many such selective marvels could be found amongst our own horticulturists, the main difference in Burbank's case seeming to be the large scale of his operations.

The point on which I wish to lay emphasis is, that in all these cases one finds in the person having this "power," not merely a great interest in the plants, but a veritable "love" for them.

These considerations all lead me to modern theories concerning the "influence of mind over matter." Is it possible that certain *psychic forces can be "tapped" by people

* The term "psychic forces" is used throughout as implying "forces as yet unknown," or ill-understood.

who thus intensely love any subject, thereby making such persons pre-potent in that direction, and enabling them to get better results than can be attained by others who are not so *intensely* affected ?

It may legitimately be asked : " In what way does this apply to the British Fern Society ? " Well, accepting the premises, the application may be in at least three directions :—

(1) I cannot escape from the view that mere persistence alone is scarcely adequate to account for all the wonderful wild finds that have been made by members in the past. Is it possible that such intense concentration on the subject causes a psychic guidance to the desired plant ? On this point, I feel I can confidently invoke testimony from our old hunters : some of them relate strange tales of the way in which their attention was drawn to their " quarry."

(2) Under culture, similar devotion would guarantee the best results.

(3) Here, doubtless, I lay myself open to attack for " heresy " and all sorts of things. Does the powerful mental focussing on the idea of raising new " beauties " actually work in some subtle psychic way, and literally " create " the desired new form ? Is it possible that such forces can influence the re-grouping of determinants in the mitotic spindles of the young cell-nuclei, and thereby cause preponderance to an already existing tendency to vary in any particular direction ? In this connection, I would draw special attention to the two following quotations from " The World of Life," by Dr. Alfred Russel Wallace :—

Germinal selection " has been the normal means of
 " adding to and intensifying that endless variety of form,
 " that strange luxuriance of outgrowth, and that exquisite
 " beauty of marking and brilliancy of colour, that render
 " the world of life an inexpressible delight to all who have
 " been led to observe, to appreciate, or to study it. It is
 " through the action of some such internal selecting agency

“that we owe much of what we must call the charming
 “eccentricity of nature—of those exuberances of growth
 “which cause the nature-lover to perpetually exclaim :
 “ ‘ What can be the use of this ? ’ ” (pp. 275-6).

. . . . “ It is quite possible, therefore, that to this principle
 “of ‘ germinal selection ’ we owe some of the most exquisite
 “refinements of beauty amid the endless variety of form and
 “colour both of the animal and the vegetable world.” (p. 277).

The question inevitably arises here whether, assuming these points, such powers could be developed and extended by anyone of our time. This I am disposed to answer by a decided negative. I feel convinced that the *conscious* direction of such forces to given ends must wait for a bigger mentality than anything known at present. Once, however, sufficient evidence of its possibility were accumulated, the subject would become of intense interest.

I must appeal to members not summarily to dismiss the question from their thoughts. In these days, when the electrical origin of all matter has been demonstrated, such points come too near practical consideration to be scoffed at. If what we know as the “inorganic” is so “forceful,” then life must be electricity in excelsis. Consequently, the influencing of the magnetic forces of the growing fern-cell by the concentrated power of such an organism as the human brain must be admitted as a debatable theory.

In conclusion, I would emphasise the purely tentative character of these views. They are advanced solely in the hope that more competent persons may be induced to investigate the theory, or, if already considered, will give the results of such enquiry.

FRAS. W. THORRINGTON.

[“Which of you, by taking thought, can add one cubit to his stature ? ”

It is true that the influence of mind over matter often seems very dramatic. Cases of faith-healing (*i.e.*, sudden and apparently almost miraculous recovery) undoubtedly occur, but in all these cases the influence of mind is first of all over mind. The optimism of one person persuades the mind of another that recovery can be attained and, this being done, cure automatically follows since the disease existed only in the imagination of the patient and therefore as soon as he is persuaded that he is well the thing is done. In less striking cases, however, a cheerful mind and a sanguine outlook can do much to influence actual disease inasmuch as this may be caused by a gloomy temperament. It is well known, for instance, that bad temper and worry interfere with digestion and bad digestion brings other evils in its train. There is no reason to believe, however (*pace* the spiritualists) that mind can influence matter except through another mind which directs the latter. No amount of mental concentration will cause a wheelbarrow to move of its own accord or a motor car to travel without fuel. With regard to persons who can persuade plants to grow better than others, these are often people of the most stolid and matter-of-fact character. They sympathise with their plants and look after their needs, giving water at proper times, supplying suitable soil, and protecting their pets from insect and other enemies. If a fern be smothered with green or black fly a syringe-full of abol or nicotine soap solution will do more than the sweetest smile upon the fern or the most malignant glare upon the vermin to promote the health of the fern. The man who loves ferns *lives* with them and is constantly on the watch to supply their needs and to ward off enemies. He cannot do it if he live in Birmingham while his ferns are in Reading or Kendal, and the warmest sympathy will not save *Asplenium marinum* if it be exposed to a temperature of 0° Fahrenheit.

EDITOR.]

A WOODLAND VILLANELLE.

In Woodland there is whispering
Of zephyrs, where, along the glade,
The ferns their verdant tresses fling.

The fronds in stealthy movement bring
A diaper of light and shade.
In Woodland there is whispering,

As waving heads resilient spring,
Where, in a gay fanfaronade,
The ferns their verdant tresses fling.

The sun gleams through each opening ;
Then flies, a very renegade.
In Woodland there is whispering :

Impulsive birds on airy wing
That shadowed harbourage pervade.
The ferns their verdant tresses fling.

Then join with me and gaily sing
The beauty of this sylvan trade :
In Woodland there is whispering,
The ferns their verdant tresses fling.

FRAS. W. THORRINGTON.

DECIDUOUS HARDY FERNS.

Ferns which are natives of cold and temperate climates, in which the conditions of the winter are so rigorous that the frondage is practically destroyed, have developed in large measure the same deciduous or leaf-shedding character as is possessed by the majority of trees. Comparatively few, however, have developed the same capacity of throwing off their fronds at a basal joint, and among our native Ferns only one, *Polypodium vulgare*, or the common *Polypody*, has this faculty, which, moreover, does not show itself at the

usual leaf-shedding season, the autumn, but only in the spring, when the new fronds are rising to replace the old, and consequently monopolise the root action. In the other species, which are deciduous, the fronds in October or November, or even earlier in some cases, commence without any obvious reason to lose their fresh green tints and become first yellow and finally brown, shrivelling eventually to feather-weight *débris*, owing to the retraction of their sap and any contained nourishment into the crown or root-stock. To many people who do not understand this provision of Nature for a thorough rest, the change is imputed to bad health, and the final disappearance or death of the fronds is thought to mean the death of the fern, the result being subsequent neglect, which makes worse the error. It has so frequently happened in our own experience, especially with lady friends to whom we have given some of our seedlings, that their subsequent loss has been owing to a mysterious disease in the autumn, though every care was taken, that we deem a word of warning not to be out of place in this connection at this season. Losses occur, however, even with those who understand this phenomenon, for where ferns are grown in pots in conservatories the absence of any obvious plant for some months is all too apt to lead to those pots being placed out of sight in favour of more presentable occupants, the result being that they are forgotten, left altogether unwatered, and thus either perish outright or are greatly weakened by the drought to which they have been unnaturally subjected.

In their natural habitats the sleeping ferns are saturated through the winter beneath a thick blanket of fallen leaves, and there is no doubt that, as with bulbs, the roots are at work preparing for the spring growth long before the centres of growth show any signs of activity. Hence one essential to the well-being of ferns is that they be kept moist throughout the winter, and a good plan is either to pack the pots in a frame with cocoanut fibre or to bury them to their edges in

the garden, and mulch them well with dead leaves, thus imitating as far as possible the natural conditions of existence in the dormant period. Our native ferns belong really to three categories, due probably to our comparatively mild winter climate. Thus in the Lady Ferns, Bladder Ferns, Oak and Beech Ferns, Mountain Lastrea, Marsh Fern, and Royal Fern we have a class which, however we may treat them, die down altogether in the autumn. Then we have an intermediate section, represented by the Soft Male Fern and Broad Buckler Fern, which only drop their fronds to the ground, but under shelter retain their greenness. Finally, in the Hard Male Fern, the Spleenworts, the Hart's-tongue, the Shield Ferns, and Blechnum we have thorough evergreens, the fronds of which are retained well into the subsequent season. In making and arranging fern collections it is therefore well to bear these peculiarities in mind, especially with planted out ferns, but, of course, when grown in pots readjustment in the winter is possible, so as to give good effect even in the dead season. The moral of this note is, however, that dying fronds do not necessarily mean dying ferns, at this period of the year, but that due precautions must be taken as regards watering to ensure that sleep does not culminate in death.—CHAS. T. DRUERY, F.L.S., V.M.H., in *The Garden*.

AMATEUR FERN GROWING.

(Continued.)

(Reprinted from *Irish Gardening*.)

which we have so carefully kept lime-free, and so kill our plants. Sandstone, quartzite and granite should be used, if all three can be obtained so much the better: they give a varied appearance and colour to the mound. Sandstone by itself is very excellent, absorbing moisture, it makes a cool damp nestling place for the roots; in its moist chinks spores germinate and cover it with green young growth.

Quartzite has not these attractions, but, especially if veined with iron stain, the whites and reds make a very attractive ground work and background to the ferns. Granite has none of the virtues of either, yet makes an excellent rock-work.

Good large stones should be obtained of slab form rather than rounded, and of very irregular shape—as regularity tends to formality, which we must endeavour to avoid. The pockets when formed must be quite irregularly disposed, and not made in formal lines all along the rockery. The stones, too, should be placed so that water falling on them is directed back to the soil and plant behind, not to fall in a stream from the front, to wash away the soil from the plant below.

We may now at last start the rockery. It may either be placed in the centre of the floor with a path all round, or built up against the wall. In either case, determine first what height it will be—*i.e.*, what slope it will have. We will suppose it to be against the wall. A long stick should be cut which will reach from wall to ground giving the slope. Two rows of vertical columns should be made of bricks, or drain pipes set on end, which will afterwards serve as fixed and solid steps for climbing up to attend to the plants, as, if the rockery stones are used for this purpose, they will gradually get displaced and spoil the “pockets” and injure the plants.

Next, at the middle of the wall space, a good heap of large stones, bricks, etc., should be made. Over these a good layer of smaller stones, etc. : over this a layer of small cinders and gravel which should extend down to the outer edge. It is well to outline the outer edge of the rockery with large blocks of stone, not too regularly laid, and such as will lie firmly without rocking about on the concrete floor : they should, further, be fixed in position by bits of cement here and there to keep them from shifting. The central

(To be continued).

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KENDAL, WESTMORLAND.



POLYPODIUM V. PLUMOSUM, WHILHARRIS.

THE BRITISH FERN GAZETTE.

NEW SERIES.

VOL. V.

MAY, 1925.

No. 5

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ASPLENIUM RUTA-MURARIA.

Embroidered on a churchyard wall ;

'Tis fitting there thy rue should be

To greet us when our spirits fall.

Embroidered on a churchyard wall,

Thou art an antidote to all

Our brooding on eternity.

Embroidered on a churchyard wall :

'Tis fitting there thy rue should be.

FRAS. W. THORRINGTON.

THE SEA SPLEENWORT.

High around the ocean cave

Grows the seaside spleenwort well ;

Little rocks when tempests rave

High around the ocean cave.

Beauty that can be so brave,

O'er our vision casts a spell :

High around the ocean cave

Grows the seaside spleenwort well.

FRAS. W. THORRINGTON.

THE AUGUST MEETING.

The Annual General Meeting of the Society will be held on Monday, August 10th, at "Fairmead" Private Hotel, St. Austell, Cornwall (Mrs. Cocks, Manageress). It was found impracticable to obtain suitable accommodation at Rosstrevor, Co. Down, although application was made early in April. Also Dr. Praeger, who is familiar with the county, reported somewhat unfavourably upon the district as a fern-hunting centre, although it is said to be a lovely and picturesque spot. In consequence of the growing popularity of holidays in August it is becoming increasingly difficult to find accommodation for a party of indeterminate numbers in that month, many of the hotels and other houses of resort being booked up long beforehand, often from the previous August. It may be desirable therefore for the Society to consider the question of changing the date of the Annual Meeting to some other month, say June or September, in which it may be possible to make arrangements for putting up a party for a few days without giving notice a year or so in advance. The Sub-Committee fixed upon Cornwall (failing the Mourne Mountains) as a county which had not yet been visited by the Society, and which has probably been less ransacked for ferny treasures than any county in England.

The geological formation is mainly granite, which will furnish a change of soil and physical basis. The formations which have hitherto been explored by the Society are mainly slate, limestone and chalk. The two latter have been most fertile in varieties, but granite may yield some surprises. St. Austell is a pleasant country town within easy reach of the sea, and also of hilly country, so that visitors will have abundance of choice in the matter both of direction and of scenery, while we have good reason to believe that home comforts will not be lacking at Fairmead. Members who wish to attend the Meeting and Excursions should give

notice as early as possible to the Hon. Secretary. The Editor regrets the delay in the appearance of *The Gazette*, which has been caused by the difficulty in making the arrangements for the Meeting.

OUR FRONTISPIECE.

POLYPODIUM V. PLUMOSUM, WHILHARRIS.

The picture, from a photograph, supplied by Mr. T. E. Henwood, of a frond on his own plant, shows a very beautiful form of the Cambricum Section. As will be seen it has some resemblance to *P. v. Prestonii*, but is even more dense than that splendid form, while the texture is also more substantial. The lasting quality of the fronds is proved by the excellence of a photograph, taken in May, of a frond grown during the previous summer. We have not been able to learn the exact history of this fern. Mr. Henwood had it from the late Mr. Whitwell, who received it from the Dublin Botanic Gardens, where it was said to have come from the late Mr. E. J. Lowe. It was presumably a wild find, but we have at present only the bare surname of the finder, who may be still living. If any of our readers can throw new light upon the subject we shall be pleased to publish any additional information. The fern is certainly one of the very finest forms of the species—possibly the best of all. It seems to be a better grower than either *Prestonii* or *Hadwinii*, both very lovely ferns, which are its nearest allies.

MEDAL FOR FERNS IN OPEN COMPETITION AT IRISH SHOW.

An event of interest and importance, which deserves to be chronicled in our annals of the Fern World, was the prominent position attained by native ferns at the Summer Show of the Irish Royal Horticultural Society in 1924. For

“The best amateur exhibit of rare plants or flowers” *The Gardeners Chronicle* offered a handsome silver-gilt medal. Under the conditions the competition was open to a very wide range of exhibitors, and was intended to form a principal attraction of the Show. It is therefore highly satisfactory to placed on record that the medal was won by our Vice-President, the Rev. Canon Kingsmill Moore, D.D., with a stand which *The Gardeners Chronicle* described as, “A remarkable group of hardy native ferns, striking in every way and reminiscent of the excellent exhibits of ferns seen in former days.” Twenty-two ferns were shown; nine of them were novelties raised by the exhibitor. Of the novelties, three have already received the Pteridological Society’s Certificate. A complete list was published in the *Chronicle*. We understand that among the competing exhibits was a very choice collection of flowering and other ornamental shrubs. We congratulate the Canon on his enterprise and the Society on the triumph for British Ferns which the award represented.

THE HON. F. G. WYNN’S FERNS.

It has been the writer’s privilege many times during the last twenty years to inspect the wonderful collection of ferns belonging to The Hon. F. G. Wynn, whose estate in Wales makes a very serious inroad into the whole County of Carnarvonshire.

Under the skilful tutelage of his godfather, the late Mr. William Barnard Hankey, who found *Polypod. v. Cambrium* on the Glynllivon estate, and whose fernery at Cranleigh, Surrey, was at one time one of the best in the country, Mr. Wynn acquired in early life an ardent and undying love for ferns, which succeeding years have tended only to intensify.

Carnarvonshire is very thinly populated. The rainfall is above the general average, and, towards the South, where

the peninsula narrows down, so that the influence of the sea is felt from both sides, the atmospheric moisture is excessive, and frost is almost unknown except on the mountains in the interior. Any snow falling on the low-lying portions remains only a few hours. This smokeless moisture-laden atmosphere is exceptionally favourable to the growth of Conifers, and the large specimens of the golden and silver varieties of *Cupressus*, *Retinospora*, *Juniperus*, *Taxus* and *Thuja*, which have been extensively planted on this estate, are as pure and unsullied as though growing under glass, or on an island in mid-Pacific.

As might be expected, ferns abound on every hand, and one may wander for days among breast-high specimens of *L. dilatata*, which appear to have taken possession of certain portions of the woods, to the exclusion of all other ferns. On the other hand, the dingle at Glynllivon is garrisoned by countless thousands of *L. f.* and *p. mas.* which here grow with a luxuriance which the writer has never before seen equalled. Specimens are to be found with stems $1\frac{1}{2}$ to 2 feet, real tree ferns. The dingle has in places been converted into a series of dells, caves and grottoes. There are fountains, rushing streams and cascades, and most realistic effects have been produced by the introduction of grotesquely attired fairies, threatening snakes, huge snails, monstrous toads and gigantic fungi, which crop up unexpectedly from among the tall graceful ferns, and are wonderfully appropriate and quite in harmony with the general sylvan surroundings. On ascending the dingle, a narrow and well-defined zone of *L. montana* and *Blechnum* is encountered, with occasional plants of *L. dilatata* and *Athyrium*, but 90 per cent. of the ferns appear to be *L. f. mas.*

The seven miles of walls enclosing the Glynllivon estate are draped with *Asp. trichomanes*, *Asp. ad. nigrum*, *Asp. ruta-muraria* and *P. vulgare*. The mansion at Glynllivon

is a comparatively modern, but huge palatial building of very imposing exterior, which replaces an older structure which was destroyed by fire some time ago. The mansion possesses its own private water supply, and also special plant for the generation of gas and electricity.

The miniature fort (mounting 36 guns), which dominates the landscape at Glynllivon, is to a considerable extent naturally camouflaged by sheets of *Aspleniums*, mostly *trichomanes*. A close search would doubtless reveal varieties, but although the writer has carefully scrutinised miles of *Aspleniums*, those beautifully incised types (which may confidently be presumed to exist) have always eluded him.

As evidence of the mildness of the climate, the writer noticed *Ad. capillus-Veneris* with 9-inch fronds growing near an old well in the open air! *Hymenophyllum* is nicely established and is revelling in the spray from a waterfall. *Cystopteris sempervirens* is thoroughly naturalized here, and seedlings are appearing in hundreds. *Cyrtomium falcatum*, *Asp. dimorphum* and *L. oreopteris plumosa* are all in robust health. *Ceterach* has been planted and seems very happy, rubbing shoulders with *Allosorus* and *C. fragilis*.

Many of the varieties of *P. aculeatum* are here doing well, one plant of *densum* with 2ft. fronds being specially worthy of note. The varieties of *L. dilatata* are exceptionally fine, and square yards of *P. phegopteris* and *dryopteris* are carpeting the ground, the former being better suited to the district than the latter. Plants of *Struthiopteris* are so plentiful and self assertive as to constitute themselves a standing menace to the welfare of the smaller growing ferns. *Osmunda* in several varieties, *Onoclea*, *Lomaria*, *L. æmula* and *L. thelypteris* are here revelling in the deep moist soil and under these ideal conditions. The writer almost overlooked a square yard of *P. lonchitis*, which was as healthy and vigorous as any on Ben Lawers, although only 100 feet above sea-level.

The fernery above described at Glynllivon may be called a natural fernery, a little judicious thinning out of the stronger growing ferns being all that is attempted in the way of cultivation. Under glass *T. radicans*, *Todea superba* and *pellucida*, and a good representative collection of large tree ferns are growing with a luxuriance suggestive of the Islands of the blest. The writer was enchanted on seeing a specimen of the now very rare *Todea Wilkesiana*, which is probably the only one in private hands in the country. An attempt was being made to establish *Dicksonia Antarctica* in the open air. As an augury of ultimate success it may be mentioned that a plant of *D. Antarctica* stands out of doors at Nanhoron in the same county, and not far distant.

The reader must now be transported in imagination to another portion of the estate some 18 or 20 miles further South, where is to be seen the main collection of ferns, passing en route Cwm Gwarra with its sheets of *Hymenophyllum*. His destination is Bodfean Hall, the immediate approach to which is along a rather narrow but very tortuous and serpentine drive, half-a-mile or more in length, which appears to have been cut out of the primeval forest many centuries ago. The mansion and grounds here are a perfect nest of privacy and seclusion: portions of the mansion date back to the Twelfth Century. The altitude here is 180 feet, and the grove of Palms and Camellias, the towering and symmetrical specimens of Lawson's golden Cypress, and the 10ft. leaves of *Gunnera scabra* afford ample evidence that the climatic conditions leave little to be desired. All the best varieties of *Athyrium*, *Lastrea*, *Polystichum* and *Osmunda* are to be seen in such a state of perfection as one seldom associates with one's ideas of an outdoor fernery. Here, where neither rust nor moth doth corrupt, may be seen the *plumose* types of *P. angulare* with fronds 2 to 3 feet, and every one perfect to the tip. *L. decurrens*, *L. atrata*, *P.*

acrostichoides and *P. setosum* appear to be equally at home. *Aff. Edwardsii* and *Ed. cristatum* are twice the size one generally sees them. A list of all the varieties here growing would approximate too nearly to the dimensions of a large catalogue. *Scols* and *Polypods* are the only ferns not numerously represented, although *P. calcareum*, *P. v. Cambricum* and *P. v. Cornubiense* are flourishing.

Not the least interesting feature in the wild fernery at Bodfean is the large natural group of some 200 *L. æmula*. This fern is indigenous to the locality, the only attention the plants receive being the removal of the large competing or overhanging *Lastreas* and *Athyriums*. Seedlings of *L. æmula* are springing up in hundreds, and, if these are assisted, they may be counted by the thousand in a short time. A few *P. angulare* are to be met with in the wild garden, but the species is by no means plentiful, and *Scols* appear to be quite non-existent. *Asp. viride* has been introduced and is doing well. *Asp. lanceolatum* is indigenous, but is more or less sporadic in its distribution. *Ceterach* has been introduced and will probably spread.

Mr. Wynn informs the writer that *Asp. marinum* grows in profusion on the rocks all along the South coast of Anglesey, but is difficult to get. It grows where sea water can cover it at certain tides, and revels in sand, gravel and broken shells. No soil. Attempts have been made to establish it on the walls of Fort Belan, contiguous to the Straits on the Southern side. The fort is an immense enclosure, with moat and drawbridge, scarp and counterscarp, glacis and redan, its spacious dock and its 100 guns. The fort (in *statu quo* as of yore) is a relic of medieval times, and is being carefully preserved by Mr. Wynn as an archæological record of the past.

An extensive nursery for the propagation and conservation of rare trees and shrubs is maintained at Glynllivon, and

contains a collection of plants which probably has no equal in the British Isles. In fact the uttermost parts of the earth appear to have been ransacked and laid under contribution with a view to making this collection as interesting and as complete as possible.

A most intricate and extensive labyrinth here also claims attention, and the exuberant growth of box and yew under the hands of a skilful topiarist has resulted in most wonderful achievements, but the writer feels that he has already exceeded his prescribed limits, and sees in imagination the editorial blue pencil busily at its work of deletion. He must therefore bring these notes to a close.

H. STANSFIELD

ASPLENIUM " FONTANUM " REFRACTUM.

We have recently had a request, on behalf of a Swiss Professor, for a specimen of this fern. Unfortunately it is more than 50 years since the writer saw the plant alive, and he has no knowledge of its present existence in a living state. Probably dried specimens may be preserved at Kew and in the British Museum and possibly in one or two other collections. There is, however, in Lowe's " Our Native Ferns " (1869), an excellent coloured plate of it which has been reproduced on a somewhat reduced scale in Druery's last fern book. Lowe states that it was first known in 1851, from the gardens at Peper Harrow Park, Surrey, having been found by a Mr. Filden in Scotland. The finder died shortly afterwards so that the history is obscure. It was named *A. fontanum* var. *refractum* by Moore and Hooker, and *A. fontanum proliferum* (on account of its occasionally bulbiferous character) by Wollaston. Lowe however considered it to be a variety of *Asplenium ebeneum*, Aiton (a species of which the normal type has not been found in Britain), and described it as such in his book in 1869. In

his later book (1891), however, he refers it to *fontanum*, but observes :—" It is just possible that *A. fontanum* is a variety of the North American *A. ebeneum*. Both Mr. Moore and Mr. Clapham held this view ; and this notion is strengthened on examination of the variety *refractum*." It is true that *refractum* is, to some extent, intermediate in character between *fontanum* and *ebeneum*, but, if it be a natural connecting link, it is, we believe, the only one known. It may possibly be a hybrid, but, whether a hybrid or a variety of *ebeneum*, it is to the last degree unlikely that such a fern would be found wild in Britain where *ebeneum* as a wild plant is unknown and where *fontanum*, if wild at all, has always been extremely rare. If really a hybrid it is probable that it was raised under cultivation and planted where found (if it be true that it really was found) either by the finder or by some other person. We notice that the author of " Britten's European Ferns " says with regard to it :—" This is probably a plant of garden origin : we have seen, when speaking of *Adiantum Farleyense*, that ferns sometimes appear in a casual way, never having been found in a wild state." It would be an interesting experiment to try to raise a hybrid between *ebeneum* and *fontanum*. We commend the attempt to those who are clever at raising ferns from spores.

F.W.S.

P. ANGULARE PULCHERRIMUMS FROM SPORES.

The wild found *angulare pulcherrimums* were described in No. 11, Vol. I., of *The Gazette* (March, 1912), and a hint was then given as to *pulcherrimums* raised from spores. At that time only one such was known, viz., Mr. H. Stansfield's *pulcherrimum* No. 1. This is still in existence, but is woefully scarce and difficult to grow. *P. a. pulcherr. polydactylum*, F.W.S., has been discarded on account of its erratic behaviour and indecision of character. Mr. H. Stansfield has raised

at least three others, which are still in existence in the collections of Mr. Cranfield, Canon Hawkins, Mr. Henwood and Dr. Stansfield. Mr. Cranfield has raised several fine forms directly from his plant (No. 2 H.S.). These seem more robust than the parent, but it is doubtful whether they are its superior as *pulcherrimums*. The present writer raised at least three fine *pulcherrimums* in one batch of seedlings from spores supplied by Mr. Henwood of *P. a. div. plumosum foliosum*, H.S. One of these died incontinently before attaining the adult state although nursed with the greatest care : another very promising one has almost died several times in spite of every care. It still survives however as does also the best of all, *P. a. pulcherrimum*, F.W.S., No. 1*, which was awarded a Certificate by the Society in 1922, and was figured in *The Gazette* of September that year. The figure however gives a very inadequate idea of the plant's real beauty, as, owing to the reduction of scale and the difficulties of reproduction by photography, its details are seen only very imperfectly in the final picture. The Rev. Canon Kingsmill Moore and Mr. Sheldon have also raised from the same source very fine seedlings which promise *pulcherrimum* character, but which have not yet attained to adult life. We believe that all *pulcherrimums*, so far raised from spores, have come from the Jones-Fox strain. It is probable however that they might be raised from other good plumose-divisilobe forms such as the Pearson, Esplan and Perry strains. The important thing is to sow healthy spores as soon as possible after they are ripe, to raise considerable batches, and to select and reselect from the offspring. The best types may be picked out from the spore-pot at a very early stage of growth—often, indeed, as soon as the first fronds are developed. They are to be recognized by

* P.S.—Since the above was written, this fern seems likely to be surpassed this year by *P. a. pulcherrimum*, H. S. No. 4, of which more anon. It is a real beauty,—F.W.S.

the curly and prothalloid appearance of the frondlets. The selected ones will not all be *pulcherrimums*, but they may be depended upon to be all *something* good. If not *pulcherrimums* they will be *pellucidums* or *plumosissimums* or very fine plumose-divisilobes. In raising *pulcherrimums* however it is almost more difficult to keep them when obtained than to raise them. Often the best of them die off or go blind without any obvious reason, but no doubt really from that innate delicacy of constitution which seems to be inseparable from very highly bred organisms whether in the vegetable or the animal kingdom. However, the best things are worth the trouble involved both in producing and in keeping them. We cannot attain to the fiery heights of perfection without considerable exertion as well as some risk of disaster.

F.W.S.

FERN GOSSIP.

Ferns have behaved rather erratically during the spring of this year. Although the winter was mild most ferns have been later than usual in starting. A small plant of *P. ang. Baldwinii* on the contrary started in October and continued to grow slowly all through the winter and spring in a cold house which gets no sunshine during the winter. It is now quite a nice well-fledged plant. On the other hand *Woodsia alpina*, which usually starts growth in January unless prevented by severe frost, did not move until the middle of April, when it woke up a little drowsily and then proceeded to business as usual. *Adiantum venustum*, Don (the hardy Kashmir species), began to grow before Christmas, and has continued without interruption until the present time (end of April), when the fronds are practically fully developed although still soft in texture. It has often been exposed during growth to 12° or 14° degrees of frost, although not for long periods. Whether the fronds would endure

exposure to *prolonged* frost, say for several weeks, while in their most delicate state, is another matter. *Cystopteris montana*, for many years a miffy and puny thing here, seems to have become acclimatized and now shows something approaching to the size and vigour of *Polypodium dryopteris*. The treatment has been the same all along. *Brachiatums* are queer things in whatever species this form of variation may appear. It has been found in *Blechnum spicant*, frequently, in *Athyrium* (once), in *Polypodium vulgare* (*semilacerum*), in *Scolopendrium*, and in *Polystichum angulare* and *P. aculeatum*. In all cases it seems to be more or less intermittent and unreliable in its appearance. *P. aculeatum brachiatum*, found on the Society's Excursion at Chard in 1921, was characteristic and very fine when first discovered, having great arms, which made the width of the frond about equal to its length. The arms themselves were also very deltoid with long basal pinnules. The plant had several crowns, which were separated and dispersed. The following season the main crown produced brachiate fronds although not equal to those upon it when first seen. Since then no truly brachiate fronds have appeared although the character has been visible to some extent in the pinnae and pinnules. A single small crown however is much more brachiate than the main one. Spores were sown in 1922 and a small crop of seedlings resulted. These are now small plants with fronds of 2 to 6 inches, and, though many of them seem to be normal *aculeatum*, a few are very promising and seem likely to surpass the parent in character if one may judge from their behaviour in a small state. *P. angulare brachiatum*, found at Totnes in 1913, has had a chequered career, having once gone blind and once nearly died. It is now represented by some dozen plants, all of which show the brachiate character, but in varying degree in different plants. In most cases the fronds are triradiate; in one or

two the pinnae are one-armed, the fronds being otherwise normal in outline, while in nearly all the pinnules are decompound and show the peculiar cutting of typical *brachiatum*. It was not until 1922, however, nine years after the plant was found, that a really satisfactory brachiate plant was produced. One needs patience with *brachiatums*. I found another one near Axminster in 1923, which was in very bad condition at the time owing to the drought and the attentions of the hedge-cutters, but which produced a fine brachiate frond under cultivation late in the same autumn. In 1924 it was a rough deltoid *angulare*, but it is hoped that it may show more character during the coming season. Mr. Cranfield, I hear, has some promising seedlings from some of his Chard finds, but these I have not yet seen. A *P. ang. divisilobum* of my own, found at Chardstock in 1921, and another one, found by Dr. T. Stansfield in the same year, have both produced seedlings apparently true to the parental character, but Dr. T. Stansfield's *deorsopinnatum*, found the same year, although a plant of quite settled character, has produced seedlings of the most surprising diversity—no two seem to be quite alike though they are all evidently of the same blood and agree in inheriting the deltoid outline of the parent. One—probably the best—is a thoroughly good divisilobe : one or two are more or less crested and several are multifid or polydactylous : many are slightly irregular, although the parent is perfectly symmetrical and constant. It is doubtful whether there will be one quite like the parent. Another find of my own (near Chard in 1921) seemed, when found, to be *angulare revolvens*, but had only a portion of a frond upon it. The same season under cultivation it produced one frond, apparently *angulare*, of the most thorough *revolvens* type. In 1922 it grew well and all the fronds were more or less *revolvent*, but the plant seemed to be more like *aculeatum* than *angulare*. The least

recurved fronds were thoroughly *aculeatum*, but others were intermediate. In 1923 it came up in spring with perfectly flat fronds and was again intermediate between *angulare* and *aculeatum*. For want of space it was thrown away as a rogue. Spores, however, had been sown in 1922 and had germinated. In 1924 the contents of the spore-pot were dumped out of doors with a bell glass over them, but were given no other care or attention. I noticed this year that some of the seedlings were alive and, although still small, they seemed to be both quite revolvent and also definitely *aculeatum*. These have been rescued and cared for, and there seems ground for hope that a *revolvens* in *aculeatum* may result. One should not be too precipitate in throwing away things which may seem disappointing at first.

AMATEUR FERN GROWING.

(*Continued.*)

(Reprinted from *Irish Gardening*.)

heap of stones, etc., serves two very useful purposes—it ensures good drainage, a *sine qua non*, and it saves a great deal of soil.

The rockwork is now built from below up, laying a good layer of prepared soil over the drainage, and then setting the rocks so as to make good pockets filled up with more soil. Large stones should be used so as to leave plenty of room between each plant, for its future development, otherwise they will become crowded and ineffective, the stronger growing kinds smothering the weaker.

The upper parts of the rockwork should be occupied by the larger growing ferns, so here the largest stones should be used; the tendency is to do just the opposite—viz., to select the largest at the commencement of the work, that is, the lower part, and find that we have nothing left for the upper parts but small stones. Before the stones are set in

place, the soil in which they are to lie should be very firmly stamped down with a heavy block of wood, so as to prevent as far as possible the sinking and settling down of the stones, by which great displacement of the whole upper fabric would occur. As the work of making the rockery will occupy several days, it is a good plan to give it a good watering every evening, the last thing before knocking off work. This helps the soil to bind up and the stones to settle. Any displacement of newly-laid rocks can be rectified next day, and the soil will have drained enough during the night to allow of work, without converting it into mud. Great care must be taken not to make a mound with stones sticking out of it, like the almonds in a plum-pudding, such as is seen in many old-fashioned gardens, or in the front "gardens" of many suburban houses. Real rock-gardens are now so common, that the proper form can easily be studied by anyone, in the various public parks and gardens: and, further, as full instructions can be got in many publications, cheap and dear, on rock-gardens, we will not go further into the matter here.

We have already stored up the materials for the soil, or "compost," as the gardeners call it, in which the ferns are to grow, and have taken care that it shall be lime-free. At the same time, it will soon be found that some ferns not only do not object to lime, but actually luxuriate in it. We should therefore have a heap of *old* lime rubbish stored somewhere well away from our main supplies of soil, also a few limestone rocks for special places. It is thus easy to supply lime where needed, but impossible to get rid of it once in the soil, hence the necessity of keeping it out of our main supply.

To prepare the compost.—With a sharp spade cut down through the whole face of one end of the heap of loam sods, previously built up into an oblong rectangular heap, a slice

about 3 inches thick. By this means we get samples of all the sods, some of which may be more loamy, some more fibrous or more sandy than others, the bits cut off are now broken by hand into lumps about the size of a walnut, and any worm, beetle or grub seen is taken out and destroyed. The same procedure is then adopted with the heap of peat sods, and the same with the heap of leaf mould. It is now seen why we advised the building of the sods carefully, a proper mixture thus is obtained, and there is no waste.

The mixture of the compost is as follows :—Two parts (say 2 buckets-full) of loam, one of peat, one of leaf-mould, and one of sand, are all put together and thoroughly mixed together by being turned over and over several times with a spade. This is used for the general soil of the rockery, and will suit nearly all ferns. Some few ferns require a special soil ; this is easily arranged afterwards by digging out the soil from a “ pocket ” and replacing it with the special mixture. For instance, Maidenhair ferns (*Adiantums*) will be found to do better without peat, so a special mixture of loam two parts, leaf-mould one part, sand one part, is made with which to replace that already in the pocket : once having a good start in that, the roots will roam farther afield, and select the parts of the general compost they most appreciate.

Again, Harts-tongue ferns (*Scolopendriums*) like lime, broken and pulverised oyster shells for choice, or, if they are not obtainable, lime rubbish. For these therefore we will select the lower tiers of the rock-work, so that the limewater from them will run away at once and not percolate into the soil of other ferns, which may hate lime. All that is needed here is to dig out a pocket, and add to the soil one part of broken oyster shells—that is one-fifth of the whole amount of compost.

The Spleenworts are a delightful family of ferns, and for the most part, dainty and delicate. A special end of the rockery, or, better still, a special rock work for themselves in one corner of the house, will be found the most satisfactory. Many of them are very hard to grow at all in a greenhouse with other ferns. Their foliage abhors moisture lying on it, or indeed even the moist stagnant atmosphere of the house which other ferns luxuriate in. Their natural habitat is old walls, ruins, rock fissures, where they can get free air about them and plenty of moisture for their roots, which wander far through the old mortar and decaying vegetation of their home. These are the most difficult conditions to obtain indoors, consequently many of the rarer and more delicate ones "damp off" and disappear. The common Wall-rue (*Asplenium ruta muraria*), for instance, has defied our endeavours to keep it alive more than two seasons. *Ceterach officinarum*, which enjoys the same conditions as the spleenworts, soon pines and disappears in captivity. These may be grown under glass in pots, but we are dealing here with rock-work, and unless specially provided for, it will be found extremely difficult to grow them. For these the special rockwork should be made in the most airy part of the house—say in one front corner, where ventilation could be obtained at each side. The rock-work should simulate an old ruin, built up of old bricks and slabs of sandstone, leaving a little more space between them than is usual in a proper building. Instead of real mortar, a quantity of old mortar should be well broken and pulverized and sifted through a coarse sieve: to two parts of this, is added one part of well rubbed-up peat and one part of leaf-mould, the whole thoroughly mixed and then wetted till it gets the consistence of ordinary mortar, and is used like mortar for building up the "ruin." If the plants are available they can be inserted between the bricks as the building progresses, and in doing so you cannot put them in too firmly or press the

“mortar” too closely about the roots. The whole thing is watered from above, so that moisture trickles through and permeates the structure completely, but never stagnates and gets too wet. Then with air circulating about them from the adjacent ventilators, they will luxuriate and show a beauty never seen in pot-grown plants, nor indeed in any other way.

At one end of the main rockery it may be desired to form a cave, at the furthest back and darkest corner—this, for the growth of Killarney and other filmy ferns. If so, do not make the mistake of having it too low down. Build a breastwork up from the floor 18 inches or 2 feet with rough stones and old bricks, filling the interstices with very wet general compost, spores of other ferns will soon settle on this and cover it with beautiful verdure: fill the space behind up to within a few inches of the top of the breastwork with stones, broken crocks, &c., then a thin layer of fine cinders, and next a layer of peat. Then get a large sod of peat, or better, some of the outer fibrous husks of cocoanuts, if the can be obtained: sink them in a tub of water by tying on a brick, and leave them there for a week, at least, till they are thoroughly soaked through, then get the rhizomes of Killarney fern, pin them down close to the fibre with wire (or hairpins) and lay them on the peat bed, filling the spaces between the sods or husks with lumps of peat. Syringe the whole two or three times a week. The roof of the cave should be about 2 feet to $2\frac{1}{2}$ feet above the breastwork in front. The ferns then can be seen and attended to without much stooping, and no further protection or closing in is needed. If sandstone sides and roof can be provided, the rhizomes will soon creep all over it.

Nothing now remains but to select and plant our ferns, and our future success will largely depend on the care with which we have made all the preceding preparations for their

reception. We are apt to be in too great a hurry to get our plants and have them growing, but it will be found that the employment and interest entailed in providing for them will be a great and real joy, and the after-care of them will be carried on with the greater zest.

In selecting our plants we would suggest that, at first at least, none but evergreen forms are chosen. If this advice is taken, we think it will not be regretted. The appearance of the house during the long winter months, bright and brilliantly clothed throughout with graceful forms in all shades of green, will excite wonder and admiration, far beyond that which will be given to it in summer.

It is true that the exclusion of deciduous forms will deprive us of many very beautiful things ; but then their time of beauty is soon succeeded by a period of decay, and then a longer period in which they are entirely lacking of interest. The space they occupied in all their glory is now vacant and unsightly, and nothing can be done in the meantime to improve it. There are plenty of others one would then like to have in their places, but we remember what they were, and think of what they will be, so cannot bear to root them up, and so endure them still longer.

Again, avoid introducing the common forms to our larger growing native ferns ; they are easy to obtain, so the temptation is great to gather them ourselves and rapidly furnish our house. Later on you may find an odd corner to be filled up where you may place one, but it will be soon found that space is too precious, and that we have no room for them.

Also be content with one specimen of each kind, thus you will become familiar with a large range of varieties, though you may not have great space at your disposal.

When planting, intersperse those with light feathery foliage amongst those with heavy foliage, the effect will be

much better ; also, as mentioned before, select small and low-growing forms for the lower spaces in the rockery, the larger-growing ones being reserved for the higher places, otherwise the smaller kinds will be smothered and obscured from sight. This makes it unnecessary, and indeed inadvisable, to have the slope of the rockery steep ; the lower the back part can be kept the better, as the higher the ferns are the less is their beauty seen. If you have the opportunity, visit a nursery where ferns are made a special feature, make a note of the type of growth of the various forms, both as to size and density of the foliage, for the plants you buy will probably be quite small, but may grow to a very large size in a couple of years. For instance, the Royal Fern (*Osmunda regalis*) may be bought in a small "thumb pot," but unless you have almost unlimited room, it is quite unsuited for your rockery, beautiful though it is. It will grow to such an immense size that it will overshadow everything within a couple of yards of its centre, and not only so, but its roots will spread so far that they will rob and kill every plant even further away ; then, if you decide to remove it, you will find a hard day's job before you, and will have pulled down a large part of the rockery before your object is accomplished.

We will now indicate some ferns suitable for an unheated fernery, with a rockery. We say advisedly for a rockery, for we are conscious that some will survive a frost there that would perish in pots. Pots will be penetrated by frost, when they are standing on shelves, that would not reach the roots in the rockery. Here they are protected by the foliage covering the whole mound, by the large mass of soil, and by the rocks themselves under which the roots lie far out of its reach. All the ferns we select will be evergreen forms, and will be roughly classified as to their habit of growth into low, medium and tall. Many others will remain

that may be tried when more experience is gained, but a sufficient number will be here given to make a good start, and all have been tried under the conditions laid down.

LOW GROWING FORMS.

Adiantum capillus veneris, *Asplenium fontanum*, *A. adiantum nigrum*, *A. lanceolatum*, *A. marinum*, *A. ruta muraria*, *A. septentrionale*, *A. trichomanes*, *A. ad. nigrum*, *A. viride*, *A. flabellifolium*, *Blechnum spicant*, *Camptosorus rhizophyllus*, *Ceterach officinarum*, *Cystopteris fragilis* (this, though deciduous, is included, as under glass it is almost evergreen, and is invaluable, as its dainty seedlings appear everywhere): *Davallia bullata* (good for the wall): *Doodia aspera*, *D. caudata*, *Gymnogramma triangularis*, *Hymenophyllum tunbridgense* (for cave): *Lomaria alpina*, *Polypodium dryopteris*, *P. phegopteris*, *P. calcareum* (these also are deciduous, but are included as they will suit the wall and will creep about the rock work, so need not leave bare spaces): *P. vulgare*, *P. v. Cambricum* (also good for wall).

MEDIUM FORMS.

Adiantum chilense, *A. cuneatum*, *A. Williamsii*, *Asplenium lucidum*, *Allosorus achrostichoides*, *Cyrtomium caryotideum*, *Dictyogramma japonica variegata*, *Lastrea recurva*, *L. montana*, *L. fragrans*, *L. erythrosora*, *Niphobolus lingua*, *Polystichum triangulum laxum*, *P. lonchitis*, *Pteris cretica alba-lineata*, *P. serrulata*, *Scolopendrium vulgare*, *S. v. crispum*, *Todea pellucida*, *T. superba*, *Trichomanes radicans* (these three for cave).

TALL FORMS.

Adiantum pedatum, *Cyrtomium falcatum*, *C. Fortuneii*, *Dicksonia antarctica* (this is a tree fern, and should be planted amongst those of medium height, so as to give it head room later); *Lastrea dilatata*, *L. rigida*, *L. aristata*, *L. a. variegata*, *L. opaca*, *L. Goldieana*, *Lygodium japonica* (scandens—

climber); *Polystichum munitum*, *P. setosum*, *P. angulare*, *P. achrostichoides*, *P. proliferum*, *Pteris crispa*, *P. argyrea*, *Woodwardia radicans*. (This splendid fern is almost too large for a modest house. Its fronds shoot up and then bend over till their tips are far below the level of the crown; it should therefore when quite small be planted, the crown pointing down, in the wall: only some of the fronds will arch outwards: they may attain a length of 9 feet. Young plants will form near the tip of each frond).

As the back wall is not prepared for the real cultivation of ferns, but only as a means of furnishing the house, our rule as to growing one of each kind does not hold good for this situation. Many common evergreen kinds can be got to furnish the wall. Numerous "ribbon ferns" (*Pteris serrulata*) some very narrow, others broad, plain or tasseled and variegated, are very suitable for this situation. "Hart's-tongues" (*Scolopendriums*) in almost endless variety may be had very cheaply. Polypodies in many varieties will creep about. Maidenhairs, too, will thrive and charm with their fairy leaflets. Many others can be obtained. All should be purchased quite small. Some of the soil is picked away from the roots, then the finger, inserted through the rabbit netting, is moved about to form a space in the soil, the roots are then carefully pushed into this till the crown is just level with the wire, then the finger is inserted a little higher up and soil pushed down on the roots and the space filled up: this second hole is now plugged with some fresh soil, a piece of moss put in, and the planting is done. A few squirts from a syringe just above the level of the plant, and you may leave it, confident that it will grow.

The plants having been given their chosen places in the rockery should be carefully planted. If they are in small pots they should be watered the evening *before* planting. Turn the plant out of the pot, and be careful in the subsequent

handling not to injure the roots. If the pot is very full of roots, just slightly loosen, or round off, the upper edge of soil where the surface was in contact with the pot; do not disturb or try to pick out the drainage crocks that were at the bottom. If the pot was not very full of roots, this drainage material may be carefully picked out. The ball of roots is then placed in a hole made with the fingers, in the centre of the "pocket" full of compost, which is then filled in around the plant and very firmly pressed in with both hands, one on each side, all round, more compost being added as it is pressed in till it is level, or very slightly higher than the surface that was in the pot. The whole pocket is given then a thoroughly good soaking with water, and left alone for three or four days, before any more water is given.

On the proper watering of ferns, a good deal of your success will depend. Never forget the very simple and common-sense fact that when they are actively growing—that is, making and throwing up and developing new fronds—they require much more water than when resting, that is, after the fronds are mature and they simply want to live, and not grow any more. Also, that they require more water in hot weather than in cold weather, and more also in dry weather than in damp or wet weather. So true is this, that my rockery gets *no* water from the beginning of November till the end of January, or if there is frost and hard weather, till the middle or end of February. Some people will hardly credit this, but to my mind it is the most important element in successfully growing ferns in an unheated house, and saving them through the winter. It must not be forgotten that we are dealing here with a rockery and not with pot plants—for them some water is necessary now and then, or they will certainly die, and if just after watering them frost appears, they will likely die, so the position with them is different and

(To be continued).

VOL. 5.



No. 6.

= The =

British Fern Gazette.

December, 1925.

EDITED BY

F. W. STANSFIELD, M.D.

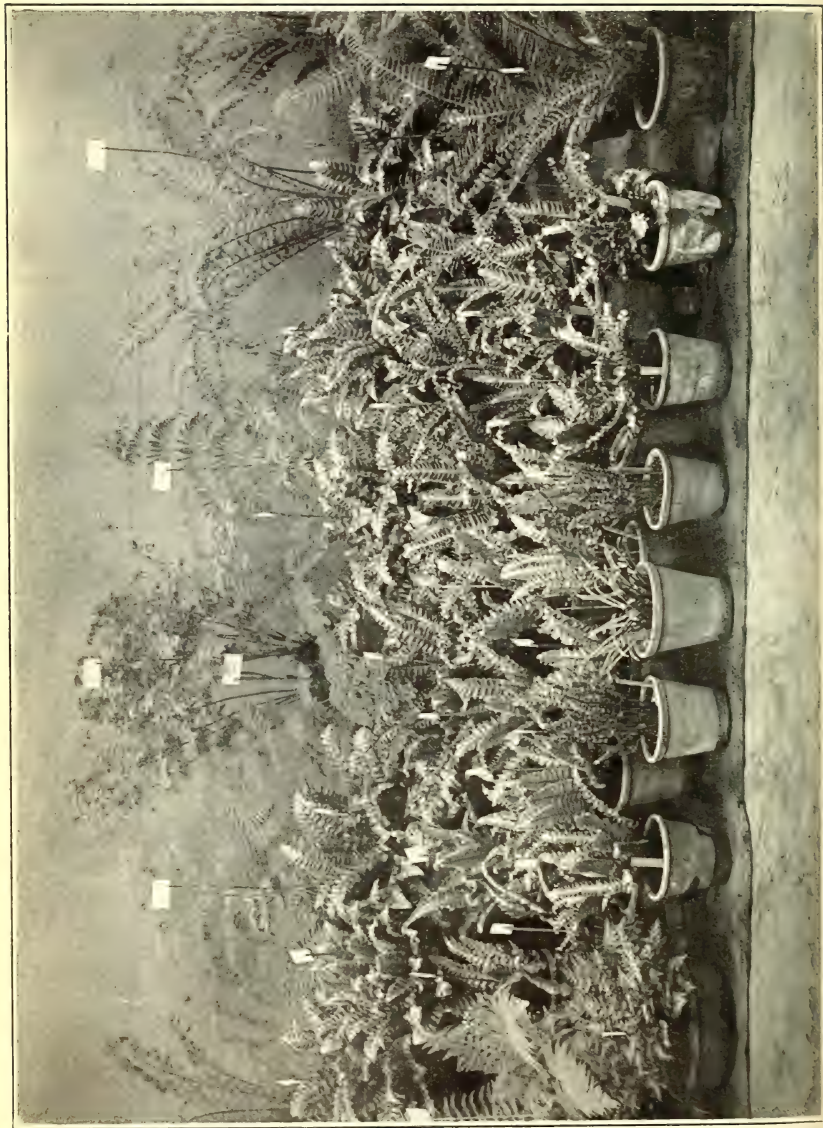
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PUBLISHED BY

THE BRITISH PTERIDOLOGICAL SOCIETY

(President: Mr. W. B. Cranfield, East Lodge, Enfield Chase, Middlesex.)

(Hon. Secretary and Hon. Treasurer: Mr. Charles Henwood, 21, Clifton Road, Maida Vale, London, W.9.)



MR. CRANFIELD'S FERN EXHIBIT. Central Section. Royal Horticultural Show, June 30th, 1925

THE BRITISH FERN GAZETTE.

NEW SERIES.

VOL. V.

DECEMBER, 1925.

No. 6

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EDITORIAL NOTES.

We have received from Mr. W. Wilson, of Kendal, who has been examining the papers of our late friend Mr. Whitwell, a paper by the late Mr. G. B. Wollaston which was presumably read at one of the Society's earlier meetings, but apparently never published. We print it in this issue. If this be compared with the article by our Vice-President, Canon Kingsmill Moore, on "Finds," it will be seen that the enthusiasm of the present day fern hunters has not fallen off from the time, half-a-century or more ago, when Wollaston, Padley and Jackson were in their prime. Mr. Wollaston also gives a system of nomenclature for British ferns which he proposed as a substitute for the one then in vogue. Some of his names have since been adopted and others are not likely to be, but interest attaches to his list of natural hybrid

ferns which we publish because there is still controversy as to the parentage of these and, in regard to some, as to whether they are hybrids at all. We have received from Dr. S. P. Rowlands of Cardiff a plant of a *Blechnum* which he has found during this year in Pembrokeshire. It has small, but neat and compact, terminal crests to the fronds, but, what is more important, all the pinnae are trying to be crested as well. This feature is new among wild finds of *Blechnum*, and, if it should prove to be permanent on cultivation, the variety will have some claim to be considered a *percristatum* in this species. Mr. F. Burton, of Hildenborough, Kent, sends us fronds of an *Athyrium* which he found last August in a wood in West Yorkshire. It is evidently a seedling of the persistent *A. f.f. Craigii* and is probably the result of a spore from a cultivated specimen, carried by the wind possibly for many miles. While on a visit recently to our esteemed friend Canon Hawkins of Stroud we noticed a plant of *P. angulare percristatum* which had been raised, among others, by Mr. Cranfield from Canon Hawkins's Irish *cristatum*. It is a very beautiful fern—better even, we think, than the one which our President exhibited at one of the Axminster meetings, inasmuch as this one seemed to have been crossed with an acutilobe form, the result being an *acutilobum percristatum* very perfect and symmetrical in outline and having beautiful round and mossy crests upon the fronds and pinnae, as well as neat crests upon the pinnules. This variety will be a favourite when better known. Professor MacFarland of Kentucky University is anxious to have a complete set of *The British Fern Gazette*, but as several of the earlier numbers are out of print the Hon. Secretary will be obliged if any member having spare copies of these will communicate with him. The numbers specially wanted are Vol. I., No. 2, and Vol. II., Nos. 23 and 24, but any spare numbers belonging to these volumes will be useful. The

Hon. Treasurer will be glad to receive any unpaid subscriptions.

THE AUGUST MEETING AND EXCURSIONS.

The 30th Annual Meeting of the Society was held on Monday, August 10th, at the Fairmead Private Hotel, St. Austell, Cornwall, the President, Mr. W. B. Cranfield, occupying the Chair. Members were present from Enfield, Reading, Great Bookham, Horsham, Welwyn, Dublin and Belfast. The Minutes of the meeting held at Axminster on August 11th, 1924, were read and confirmed. The President, Vice-Presidents, Hon. Secretary and Treasurer, Auditor and Editor were re-elected. The old members of the Committee were also re-elected, two vacancies being filled by the election of Mr. T. Brown, J.P., of Belfast, and Mr. T. Blow, of Welwyn, Herts.

The financial statement was passed subject to audit.

There was considerable discussion as to the date and place of meeting for 1926, and it was eventually resolved that the date should be fixed for the first Monday in September and that the place should be left to a Sub-Committee consisting of the President, Hon. Secretary and Editor.

Fronds were exhibited by the President, Mr. T. E. Henwood, Dr. Stansfield, Rev. Canon Kingsmill Moore and Mr. Blow. Mr. Cranfield's exhibits included some five or six seedlings which he had raised from *Polyst. angulare pulcherrimum*, H. Stansfield No. 2. All these were exceedingly fine things, Nos. 1 and 3 being considered the best. *P. ang. pulcherrimum*, Cranfield No. 1, was of true *pulcherrimum* type with long pendulous and falcate pinnules, and for this Mr. Cranfield was awarded the Society's Certificate. No. 3 had also very long pinnules, but of less falcate and less finely cut character. Nos. 2, 4, 5 and 6 were similar, but slightly inferior to the other two. The whole series had a general resemblance to

the *rarefactum* type of *plumosum*, and it was suggested that the parent was from the same source as this strain.

Mr. Henwood exhibited fronds of *P. aculeatum pulcherrimum*, Druery, in fine form: *P. ang. pluma-Struthionis* No. 2; and a new seedling of the *rarefactum* strain very finely dissected and mossy, but not yet fully developed; also *P. ang. divisilobum*, Bland, in fine condition.

Dr. Stansfield exhibited *P. angulare pulcherrimum*, H.S. No. 4, which he had received as a small seedling half-a-dozen or more years ago from Mr. H. Stansfield, but which had only this year come out in its adult plumage. It is an exceedingly beautiful form, unsurpassed by any *angulare pulcherrimum* at present known. He was awarded the Certificate of the Society for it.

Mr. J. Meade, of Old Connaught, Bray, Co. Wicklow, sent a frond of *P. ang. tripinnatum*, Meade, which he had found wild in Ireland some years ago. This was a fine form, and, although not superior to older forms such as *tripinnatum*, Gillett, and *tripinnatum*, Padley, it was awarded a Certificate as a new wild find.

The Rev. Canon Kingsmill Moore exhibited some cruciate and crested seedling lady ferns, apparently derivations of *Victoriae*, and also a few neatly crested fronds of the *formosocristatum* or *gemmaum* type. These were not considered to have attained their ultimate development.

Mr. T. Blow showed a large bunch of fronds, of normal types but very luxuriant, which he had picked up in various places on his way from Welwyn by motor.

A hearty vote of congratulation was accorded to the President for his magnificent display of British Ferns at the Royal Horticultural Society's Amateur Show on June 30th. 1925, for which he was awarded a gold medal. Also to Canon Kingsmill Moore for his fine exhibit of British Ferns at the Irish R.H.S. Show in 1924, for which he was awarded

a silver-gilt medal presented by *The Gardeners' Chronicle* for the best amateur exhibit of rare plants of any kind.

Mr. C. Henwood, Hon. Secretary and Treasurer, was congratulated upon his success at the R.H.S. Amateur Show in June, when he obtained the first prize with six British Ferns in competition against ferns of any kind.

During the six or seven days that the members remained at St. Austell the country was sedulously hunted for ferns, but the immediate neighbourhood proved disappointing, only a single find being made (by Mr. Henwood), viz., a ramose form of *Asplenium Adiantum-nigrum*. Excursions further afield proved that Cornwall is by no means deficient in ferns, the following species being observed:—*Aspleniums Ad.-nigrum*, *lanceolatum*, *ruta-muraria*, and *trichomanes*; *Athyrium filix-fœmina*; *Blechnum spicant*; *Lastrea æmula*, *L. dilatata*, *L. filix-mas*, *L. pseudo-mas*, *L. montana* and *L. spinulosa*; *Osmunda regalis*; *Polypodium vulgare*; *Polystichum angulare*; *P. aculeatum*; and *Scolopendrium vulgare*.

The beautiful Luxulyan Valley and the Glyn Valley proved very rich in species, and the scenery was much enjoyed, but no further discovery of a variety was made, although attempts at variation were here and there observed. The members were delighted with the sight of *Osmunda regalis* and *Lastrea æmula* in great luxuriance and profusion. *Lastrea montana* and *Blechnum spicant* were also more luxuriant than they are usually to be seen in the north.

The hospitality of Miss Cocks at Fairmead conduced greatly to the comfort of the members during their stay at St. Austell, and her garden contained many fine specimens of rare and beautiful shrubs such as *Magnolia grandiflora*, *Desfontainea spinosa*, *Skimmia japonica*, *Romneya Coulterii* and the finest myrtle tree (in full flower) that we have seen anywhere.

OFFICERS FOR 1925-26.

President :

Mr. W. B. Cranfield.

Vice-Presidents :

Mr. A. Cowan,	Mr. J. J. Smithies,
Dr. F. W. Stansfield,	Mr. T. E. Henwood,
Rev. Canon H. Kingsmill	Mr. G. E. Stephens,
Moore,	Mr. J. J. Sheldon.

Committee :

Mr. R. Whiteside,	Mrs. Groves,
Mr. W. Wilson,	Mr. T. Blow,
Mr. H. Relton,	Mr. P. Greenfield,
Mr. T. Brown.	

Hon. Secretary and Treasurer :

Mr. C. Henwood.

Editor :

Dr. F. W. Stansfield.

Auditor :

Mr. J. J. Sheldon.

THE BRITISH PTERIDOLOGICAL SOCIETY.

RECEIPTS AND EXPENDITURE FOR THE YEAR 1925.

1925.	INCOME.	EXPENDITURE.	
		1925.	1925.
	£ s. d.		£ s. d.
To Balance in hand from 1924	... 21 10 11	By Affiliation Fee to R.H.S.	... 2 2 0
„ Subscriptions	... 17 10 0	„ October, 1924, "Gazettes"	... 12 2 6
„ Advertisement	... 2 2 0	„ May, 1925, "Gazettes"	... 12 2 6
„ Sale of "Gazettes"	... 10 0	„ Balance in hands of Treasurer	... 16 10 11
„ Received from University of Kentucky, U.S.A., for Set of "Gazettes"	... 1 5 0		
	£42 17 11		£42 17 11

Audited and found correct this 3rd day of November, 1925.

J. J. SHELTON,
Auditor.

BRITISH FERNS AT THE R.H.S. AMATEUR SHOW, JUNE 30th, 1925.

At this important exhibition our Hon. Secretary, Mr. C. Henwood, obtained the first prize for "Six Ferns grown under glass." It will be noticed that competition was not limited to British, nor, indeed, to hardy ferns, but was open to all ferns from whatever clime or of any origin. Mr. Henwood exhibited six British fern varieties, viz., *Asplenium trichomanes Trogyense*, *Athyrium f.f. acrocladon densum*, *Blechnum sp. trinervium coronans*, *Lastrea f. mas fluctuosa cristata*, *Polys. angulare divisilobum nitescens*, and *Scol. v. crispum fimbriatum*, and was opposed by a collection of exotics. His victory is significant of the decorative value of British ferns.

At the same exhibition our President, Mr. W. B. Cranfield, exhibited (not for competition) a very comprehensive and important group of British ferns, for which he was awarded the Gold Medal of the Society. The group consisted of 150 plants, mostly large and all well developed, of the very choicest varieties of British ferns, but included also some normal species for the sake of effect. Among the plants shown were 13 different seedlings of *P. aculeatum gracillimum*, ten of them being Mr. Cranfield's own raising, two the late C. B. Green's, and one the late C. T. Druery's; *P. ang. acutilobum proliferum*, Wollaston; *P. a. hirondelle*, Moly; five different types of *P. a. divisilobum plumosum*; *Osmunda regalis cristata*; *Lastrea montana cristata-gracilis*, Druery; *L. pseudo-mas fimbriata-cristata*; *L. p. m. cristata angustata, polydactyla*, Wills, etc.; *L. filix-mas linearis polydactyla*, *L. f. m. grandiceps*, and *cristata*, Troughton; *Scolopendrium vulgare crispum* in thirteen distinct forms; *Athyrium f.f. plumosum*, twelve distinct types; *A. f.f. Clarissimum*, Jones; *A. f.f. cl.*, Bolton, and *clariss. cristatum*, Garnet; *A. f.f. Victoriae*, etc. Many of the plants were lifted from the

open, bagged, and replanted on return. They were too large to pot. It is interesting that few of them suffered from the removal, while some were actually benefited, the soil they had occupied having been stirred and renovated before they were replaced. The group was probably the finest and choicest exhibit of British ferns ever shown in London, and attracted great attention and admiration. It was photographed, but was so large that this had to be done in three sections. We are enabled to reproduce one of the sections, which is chosen not because it was choicer or better than the others, but because the *Scolopendriums*, of which it was largely made up, form a picture which is more suitable for reproduction than the other two.

THE KEW COLLECTION OF BRITISH FERNS.

Upon the invitation of the Director, Dr. A. W. Hill, F.R.S., a small Sub-Committee of the British Pteridological Society visited Kew Gardens on September 23rd and October 7th for the purpose of overhauling the collection of British ferns which it is proposed to reorganize. The visitors, consisting of Mr. W. B. Cranfield (President), Mr. T. E. Henwood and Dr. Stansfield, were met by the Director, Dr. Hill, the Curator, Mr. Bean, and Mr. Irving, the Hardy Plant Foreman, and were conducted to the ground proposed to be devoted to British ferns under the new arrangement. The site seemed to be admirably adapted for the purpose, being shaded and sheltered by large trees, which, however, were not so thick as completely to occupy the ground with their root-systems. The present collection was found to consist of a considerable number of plants mainly contributed by the late Colonel A. M. Jones, Mr. W. C. Carbonell and Mr. E. J. Lowe. There were however many duplicates of angulare forms, and a large number of somewhat indefinite acutilobe and divisilobe

varieties, probably seedlings from the Carbonell collection. A few good old standard varieties were to be seen, some of which are now comparatively rare, e.g., *P. angulare tripinnatum*, Padley, *P. a. latifolium*, Moly, *P. a. setoso-cuneatum*, Phillips, *revolvens*, Wills, *grandiceps*, Talbot, *grandiceps*, Abbott, *cruciatum* (a very fine and thoroughly characteristic plant), *venustum*, Padley, and *multilobum ovale*, Padley. A striking plant was a magnificent *P. ang. divisilobum* somewhat resembling, but not identical with, *P. a. divisilobum*, Bland. It was not identified with any special named form, but was probably one of the Jones-Fox or Carbonell seedlings. Not a single plant of the *angulare* plumose-divisilobe section was seen although there was a foliose-divisilobe form. Varieties of *P. aculeatum* were few and far between, almost the only one of much interest being *P. ac. pulcherrimum*, Bevis, of which several plants were found. The collection of varieties of *Scolopendrium vulgare* was very meagre and poor, and the plants were evidently rather unhappy. In all probability many varieties of this species had died out. The collection of *Polypodies (vulgare)* was equally poor although one or two good forms were in evidence. There was a fair collection of the older forms of *Lastrea filix-mas*, *L. propinqua* and *L. pseudo-mas*, including a fine patch of *L. f.-mas Bollandiæ*. *L. dilatata (aristata)* was but poorly represented and the lady fern not much better. Only one plant of *Lastrea montana* was seen and this was the normal form. Our President and other members propose to contribute plants of some of the standard varieties of ferns so as to fill in some of the gaps in the collection, and it is hoped that, in this way, the collection may become a representative one and worthy of the premier national collection of plants in Great Britain. It must be admitted that the climate of Kew, which has greatly deteriorated during the last forty years owing to the smoke of the ever-encroaching population of Greater London, is not an ideal one for ferns, and it will

be difficult to maintain, in the open air and in their real beauty, some of the more exacting varieties of British ferns, such as the *angulare pulcherrimums*, the *gracillimum* forms of *aculeatum*, and some of the more delicate lady ferns and *Aspleniums*. With a little glass shelter however there is no reason why such ferns as these, and the choicer varieties of *Polypodium vulgare* and *Blechnum spicant* should not be successfully cultivated.

THE ROCK BRAKE (CRYPTOGRAMME CRISPA).

Where falls a cruel storm of riven slate
 Below the mountain crag, the Parsley Fern
 Ventures its tender leafage, dares its fate ;
 And lives serene though all is grim and stern.
 The fusilade that threatens its eclipse
 This modest herb transmutes into a gain ;
 Aye stronger with each searching rootlet grips ;
 While fronds renew to joy in sun and rain.
 Shall we who view this conquest ever fear
 To challenge all the evil in our way,
 All undismayed gaze on a prospect drear,
 And win success from that which came to slay ?
 So may endurance ever smiling rise
 Through fell misfortune to a worthy prize.

FRAS. W. THORRINGTON.

22nd November, 1925.

NOTES.

Quite recently I have been engaged in correspondence with Professor D. H. Scott, M.A., F.R.S., etc., on fern topics suggested by his book "Extinct Plants, and Problems of Evolution." In this work, he practically recants the views he expressed formerly in "The Evolution of Plants," viz., that ferns such as the Palæozoic "Primofilices" were the

probable ancestors of Marattiaceæ; while the latter, in their turn, gave rise to the Pteridosperms, and so on to the Cycads and our modern flowering plants. These opinions seem to have been much modified by two facts of recent research. Firstly, then, the Pteridosperms are now known from such very early rocks that it really looks as if *they* ante-dated the Marattiaceæ in time. Dr. Scott even quotes as "very likely" to be correct, the American observations of a fossil known as *Eospermatopteris*, which they consider a Pteridosperm, from the Middle Devonian age. He also stresses the fact of the high organization of Upper Devonian Gymnosperms. Secondly, "the Marattiaceæ," he says, "according to present knowledge, appear on the scene far too late to be in the ancestry. Moreover, "even in the Lower Carboniferous, no Ferns except *Primofilices* are as yet known, while Pteridosperms were abundant." His latest conclusion is, "I still think the Cycad line is best derived from the Pteridosperms of the preceding age, but suspect that the Pteridosperms and Gymnosperms generally *were a parallel development to the Ferns* (Italics mine.—F.W.T.) springing from some unknown early race."

A revised edition of his "shillingsworth of 14 years ago," the "Evolution of Plants," has just been passed for the Press, so we shall soon have an opportunity of comparing the older theories with the latest deductions, *seriatim*.

Among Fernists, I need make no attempt to provoke interest in these topics. All true Pteridologists will be eager to keep track of any revised views on fern phylogeny. Frankly, at first, I was somewhat disappointed with the newer evidence. The case formerly stated seemed such a very clear piece of reasoning. It was quite disheartening, at first, to gather that the Marattiaceæ may even prove to be derived from some Pteridosperm-like ancestors. On reflection, one becomes consoled. There is, evidently, still a case to be made out.

perhaps—on future evidence—for at least a possible rise of seed-plants (Angiosperms) from fern-like ancestors. After all, there remain those incredibly long ages of Cambrian and Silurian rocks. Who can say what data may ultimately emerge from those dim epochs, so remote, yet quite possibly guarding fossils of paramount import to our conceptions of the rise of the higher plants? Quite recently, have we not the revelations, under the microscope, from the Rhynie chert of the Devonian age? Similar evidence, from even earlier strata, may prove equally interesting on fern phylogeny. “So mote it be.”

FRAS. W. THORRINGTON.

NOTE.—On September 26th, at the London Day Training College, Southampton Row, London, by request of the School Nature Study Union, I again gave a demonstration with a series of fronds of British Varietal Ferns. As on previous Annual Exhibitions, these fronds were much admired. Perhaps some of our Pteridological members might like to join the School Nature Study Union (4s. 0d. annually—Hon. Secretary, Mr. H. E. Turner, 1, Grosvenor Park, Camberwell, S.E.5) and reinforce my poor attempts to impress that body with our unique fern heritage. In any case, “School Nature Study,” their journal, is well worth keeping in touch with.

FRAS. W. THORRINGTON.

NOTES.

An account of the Zygopterids is given in Dr. Scott's book, “Extinct Plants, and Problems of Evolution.” These strange primitive ferns appear to have had no less than *four* distinct lines of pinnae on their fronds, and Professor Scott remarked that no similar case is known in any other plants, living or dead.

Well, I am no palæobotanist, and know nothing of the Zygopterids, but, in my letter, I seem to have interested Dr. Scott by narrating the instances of abnormal pinnae amongst British varietal ferns, and suggesting that this may even throw some light on these fossil marvels. He says,

"I wish you would work this out," but I can only plead that my ignorance of the Zygoterids rather unfits *me* for the task. I had quoted, especially, *Blechnum spicant*, var. *paradoxum*; and also mentioned the cruciate pinnæ of such forms as *Athyrium* f.f. *Victoriæ* and *Fieldiæ*, and the "setting" of pinnæ in *Lastrea montana*, var. *Barnesii*.

Perhaps our Editor, from the treasures of his memories, can say whether photographs were taken of the *Blechnum*, as evidence such as that is most desirable? Also, can he, or any other member, supplement our existing knowledge of such peculiar pinnæ amongst our varietal ferns? I can foresee, very clearly, that, as the late Mr. Druery frequently said, our "B.P.S." data are going to prove of very great interest to the scientific world.

FRAS. W. THORRINGTON.

THE NORTHERN BRITISH PTERIDOLOGICAL SOCIETY.

My dear Friends,

You have done me the honour to ask me to read you a Paper on "Our British Ferns and their Varieties." This I am grieved to say that circumstances prevent me doing, but I will write down a few memoranda that I have collected from time to time, which I hope may be interesting to you, and which I will ask our Honorary Secretary to read in my place.

Our British Ferns are divided into eighteen genera and fifty species, inclusive of four doubtful, and seven natural hybrids. Their varieties are innumerable, reaching already nearly two thousand.

The search after them is the most interesting and highly fascinating occupation that can profitably be entered into, and when understood is all absorbing, so that those who pursue it have acquired the nickname of *Pteridomaniacs*. Nothing can give greater pleasure, or be more agreeable

than to wander amongst the Somersetshire, Dorsetshire, and Devonshire lanes, or on the mountains of England, Scotland, and Ireland, with a few real friends of similar pursuits ; nothing so interesting, nothing so invigorating or exciting as to hear one of your party call out that he has made a new *find*, and that it has got three crowns, so that all may participate. I know no such pleasure.

Then again, the interest and delight of sowing spores, and noting and watching their growth ; still more the crossing of *varieties* (I may by way of instruction mention whilst on the subject of hybridisation, that no one has yet hybridised two *species*).

The cross-bred varieties are just as numerous as the varieties of roses, fuchsias, etc., and it should be the aim of every grower of ferns to keep, show and name the best, and throw away or leave unnamed the worst, for, if not, very shortly there will be a glut in the market.

To all collectors of ferns I should strongly advise them to study the characteristics of each *genus*, and the reason why certain names are given, such as *Polypody*, which means many-footed ; *Polystichum*, many ranks, in allusion to the position of the spores on the back of the frond being in ranks like soldiers ; *Adiantum*, from “ adiano,” to throw off wet like a duck’s back, etc., etc. The shape and position of the indusium or the covering of the spores ; some are peltate or shieldlike, as in *Polystichum* ; others kidney shaped as in *Lastrea* ; some with a cyst or sack like *Cystopteris* ; *Botrychium*, which has the spore cases like a bunch of grapes, from “ botrus,” a bunch ; and in this way through all the genera.

When they have mastered the nomenclature of the genera, then let them study the diagnostics of the *species*. Take mine of *Lastrea filix-mas*, *L. pseudo-mas*, and *L. propinqua* : *L. filix-mas* section of frond in early growth recurved ; *L. pseudo-mas*, plane ; and *L. propinqua*, concave.

Then take *Lastrea dilatata* and its allies, which are distinguished by the scales on the stipes : *L. dilatata* has them long pointed with a dark centre ; *L. spinulosa* has them oval and concolorous. In *L. æmula* they are laciniate with dark centre.

In this way anyone may soon make himself master of the species.

The *varieties*, as I formerly mentioned, are positively endless, and their names are of no scientific importance ; they may eventually require trivial names, such as Mrs. H. or Mr. John : but I myself should greatly prefer to give them such characteristic names as would describe the particular variety as long as possible, in fact such as they are known by at present.

Thanking you all for your courtesy,

I remain,

Your Honorary Member,

GEO. B. WOLLASTON.

NATURAL HYBRIDS.

(G. B. WOLLASTON).

Lastrea pseudo-mas (Wol.) $\times$ *L. spinulosa* (Presl.).

Now called *L. remota* (Moore).

Asplenium marinum (Linn.) $\times$ *A. lanceolatum* (Hudson)

Now called *A. marinum*, *var. microdon* (Moore).

Asplenium marinum (Linn.) $\times$ *A. Adiantum nigrum* (Linn.).

Now called *A. Adiantum nigrum*, *var. microdon* (Moore).

Asplenium trichomanes (Linn.) $\times$ *A. viride* (Hudson).

Now called *A. refractum* (Moore).

Asplenium trichomanes (Linn.) $\times$ *A. Adiantum nigrum* (Linn.).

Now called *A. trichomanes*, *var. confluens* (Moore).

Asplenium trichomanes (Linn.) $\times$ *A. ruta-muraria* (Linn.).

Exotic.

Asplenium septentrionale (Hoffman) $\times$ *A. ruta-muraria* (Linn.).

Now called *A. Germanicum* (Weis).

ON "FINDS."

"A good find." The mere thought of it quickens the blood of the initiated. As for those outside, they may be cold, even contemptuous at our enthusiasm, but bring them in, and new joys will dawn quickly on their lives. The "finds" which stir us of the British Pteridological Society are of course ferns. We are prepared to allow the joy of "finds" in other walks, but with us it is ferns, British ferns, that fill the horizon. No country ramble without the hope of something never got before! There sounds the keynote of our thoughts; and, though it be true that "a good find" is rare, such is the inexhaustible variety of British ferns that every walk will yield the skilled eye something which varies from the normal.

Anyone who seeks rapid schooling in the way "finds" are made should join the Society, and make sure of attending the Annual Meeting. Of a celebrated hotel it is said that no one need seek admission who cannot play, or at least *talk* golf. Certainly our annual meetings are crowded with fern lore to an astonishing degree, and naturally "finds" and where to find them are prominent. How this well-known variety was got; where that grand form originated; who was the chief hunter, and what were his methods. Topics such as these run riot at every turn, and they take life often from the presence of the "finds" themselves, which members have brought for exhibition. Not infrequently, too, the finders are there in person, exchanging reminiscences: "Ah, you remember where that *Scolopendrium* grew." "Yes, and this *Polypodium*. You and I espied it together, the rest somehow passed it by."

A fern hunt, no doubt, shows little to excite the envy or the emulation of him who knows nothing about ferns; but that is so with all specialised sport. Things absolutely strange are commonly confronted with indifference. There

was a wide gap between the genius who devoted himself to picturing the angler a "compleat" and the other genius who described his craft as a worm at one end of a rod, and a fool at the other.

To see our Society at sport the casual onlooker might think a number of middle-aged gentlemen had gone hedge-mad. A thin line at each side of the road stepping slowly and peering intently into—well, the onlooker might say into nothing; but the fernists know better. They find those leafy hedgerows stored with wealth. The place has been chosen because it abounds with ferns, and presents ferns everywhere. What those thin lines are searching for is of course some choice and hitherto undiscovered treasures, and the quest is not wholly a simple matter. The untrained would pass "a good find" daily, as a bushman might pass a diamond. Observe the care with which eyes range up and down; see the sticks, if they have iron hooks all the better, moving away this obstacle or that, for better view. Someone has said that a gardener would need a cast iron back with a hinge; the complete fernist would be helped by an eye both microscopic and telescopic. One searcher bends down to examine a find at his feet, the next inspects the centre of the bank; they will both miss a rare specimen growing high up. So it is always; the most skilled searcher will miss where a tyro may find. This gives inexhaustible variety to the sport, and an unlimited stock of hope, for no one can foretell the site where "a good find" has started into existence: the top of a high wall, the side of a steep cliff, the roof of a cave, the outer wall of a bridge; these and many other unexpected homes have been chosen by "good things." Perhaps the best "find" that ever came the writer's way was a *Scolopendrium* which grew where a stream beside a mountain road had carved itself a channel from four to eight feet deep. Over the gulley thick brambles had closed, and the "find" meant a crawl through the tunnel thus formed.

Next to the thrill of discovery the excitement of the evening inspection takes rank. Even a solitary hunter examines his discoveries with some trepidation, when he returns to them in cold blood. But when a party have been at work, and scattered here and there to enlarge the process, then indeed the opening of the botanical cases is an engrossing event. From every side keen eyes look on. They are always critical, kindly but keen. There is full appreciation of even minor points of interest, full praise for anything that promises to be of some permanent value; but if the eager and tremulous finder has indeed brought in a treasure, even though it may not quite be "that *pulcherrimum*" for which all long, he may count on rich reward in congratulations as sincere as they are loud, and also a fame among fern lovers which will not easily die.

H. KINGSMILL MOORE.

THE PROPAGATION OF A.F.F. UNCO-GLOMERATUM.

In accordance with his usual custom the writer, last autumn, laid down three large pans of detached fronds of *A.f.f. unco-glomeratum* with a view to the propagation of plants by apospory. These were kept in a cold-house, and the tips of the fronds continued to grow more or less all through the winter, which, fortunately, was a mild one. When frosty nights were anticipated, several sheets of paper were placed over the glass covers, and were removed the following morning if the outdoor temperature was above freezing point. Prothalli were expected as a natural sequence in 12 to 18 months, and fronds a year later, say $2\frac{1}{2}$ years from the start. The conditions must have been unfavourable as all the fronds eventually became brown and to all appearances dead or moribund. The stems however must have retained a certain amount of vitality, for, by the beginning of April (five months from laying down), plants began to

appear and are still appearing, 36 having been counted up to this date (September 12th). The plants appear to spring either from the half-decomposed stems or from the hardened unfurled terminal tip of the fronds. Although a daily microscopic examination has been made from start to finish, the writer is unable to say definitely from whence the plants spring.

In another case some half-developed fronds were accidentally broken during last May. These were pulled to pieces and laid flat, in close contact with moist sterilized soil, and kept under close culture. One piece about an inch long was stuck in the ground like an ordinary geranium cutting (there being insufficient room in the pot to accommodate it if laid flat. Nothing was expected from this. However, the frond appeared to be overflowing with vitality, and, instead of damping off and rotting from the base upwards, it retained its healthy green colour, continued to unfurl, and eventually built up a sort of crown flush with the ground, and now is a thriving plant, and perfectly safe. One can only assume that a bulbil has existed on the cutting, and that the bulbil must have been flush with the surface of the soil when the cutting was inserted. Anyhow, a plump crown has been formed, of this there can be no question. The cutting being only a partially developed frond continued to unfurl for weeks after being planted, but strong fronds are now being sent up, and the plant is well rooted.

There are several instances on record by very reliable cultivators (Mr. Leighton of Kilmarnock, and the late Mr. Edwards of Moston) of cuttings of this fern rooting and making plants straight away without the formation of prothalli, and the solution undoubtedly lies in the plant's bulbil-bearing capacity. In confirmation of the above the writer announces that he has succeeded in inducing a bulbiferous condition in *unco-glomeratum* by close culture, a correct

regulation of the conditions of soil moisture by subterranean watering, so that the soil surface is always drier than the underlying strata, and by maintaining a carefully balanced atmosphere almost at saturation point. True bulbils have been formed, some having roots an inch long. The earliest fronds on very young this year's plants (especially the fronds trailing along close to the ground) are the ones in bulbiferous condition. Many of the bulbils are quite microscopic and in 99 cases out of 100 would be almost invisible without the help of a microscope. It can readily be understood that cuttings inserted from fronds swarming with almost invisible bulbils would be likely to deceive even the very elect among fern enthusiasts, and would convey the idea that fronds had actually struck root. It may be mentioned that *A.f.f.uncum* (one of the presumed parents of *unco-glomeratum*) has been known to produce bulbils when plants have been grown under close and crowded conditions so as to ensure a more uniform degree of atmospheric moisture.

H. STANSFIELD.

TWO CULTURAL NOTES.

The local supply of thumb pots having given out, and a batch of sporelings an inch or so high awaiting replanting, it was decided to make use of some of Harvey's Fibrex Pots which were ready at hand. These "pots," which are advertised in the Gardening papers, may be described as cubes of dried fertile mud, each with a space hollowed out to contain a small plant. The roots are carefully inserted into the hollow, the remaining space being filled with a little fine soil which is gently pressed in. A little water is given, and the deed is done. The tiny ferns planted out in this way have grown quite nicely, and while it is not claimed that the method is superior to ordinary potting, it has several advantages which make it worth bearing in mind. The pots are

cheap, easily stored in the dried state, and do not take up much room in use. The little cubes can be stood, with a small space between each, in any shallow box containing some sand or fine ashes at the bottom, or they may be placed on the ordinary greenhouse staging. Watering must be carefully done from above (a feeding cup with spout, or even a fountain pen filler will do ¹), until the plants are well settled. Over-watering makes the mud pots sodden and soft. As growth proceeds, the roots invade the walls of the pot, and when desired the whole affair, pot and all, can be planted out into the open ground, or into an ordinary earthenware pot. These Fibrex specialities are sold in three sizes, but the smallest—No. 1—is big enough for most small sporelings at a stage when pricking out is needful.

Small pots of the ordinary variety often give a good deal of trouble owing to their tendency to dry out quickly. This creates considerable labour in watering, especially when a large batch is being dealt with. In nurseries, this problem is partially solved by plunging the pots up to their brims in sand or fine ashes. I have found old fibre in which bulbs have been grown, very useful for this purpose. But bulb fibre cannot always be obtained in sufficient quantity, and so another experiment was made, and a supply obtained of the material in which foreign potatoes and tomatoes are packed for export. This can be obtained in large quantities at certain seasons from the fruiterer, who is usually glad to get rid of it, and enough is readily procured to fill a large garden frame. The material must first be well moistened—this being the only troublesome task—before the pots are embedded in it. The mass is afterwards easily kept moist, but being porous does not retain too much water. If some coarse sand or gravel is available, this may well be mixed with it. One disadvantage it has, in common with other plunging material, is that worms are rather fond of it. I have tried a sprinkling of soil fumigant below, but the effect

is probably short-lived. Incidentally, this material being apparently peaty in character, is suitable when partially decayed for mixing with soil for fern compost in the open garden, and is in any state useful as a mulch during hot weather.

S. P. ROWLANDS.

AMATEUR FERN GROWING.

(*Continued.*)

(Reprinted from *Irish Gardening.*)

difficult. In the rockery, however, the soil never gets, during the three winter months, so dry that the plants will suffer: their roots are tucked away under the stones in damp cool earth, there is little evaporation, and the plants are not actively growing. Extra water at this time will make the soil cold and sour, will induce an over-moisture-laden atmosphere, and damping or mildew of the foliage will be the result; besides, if frost penetrates, it will have a much more serious effect on the wet earth than it would on dry, killing the roots where it penetrated.

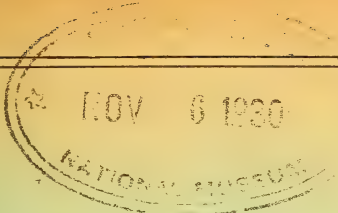
The next, perhaps startling, proposition is, do not water your ferns overhead—that is, do not sprinkle or wet the foliage. The only exception to this rule is in the case of filmy ferns (*e.g.*, Killarney fern). These, on the other hand, must be constantly watered overhead, so as to keep the fronds damp. Some few ferns make such an abundance of spores, that these and the spore cases when shed cover the foliage with thick brown dust which may be objected to; some of this may be removed with a feather brush, or it may be syringed off—in that case a dry airy day, without cold wind, should be selected, the plant or plants syringed, the excess moisture shaken off, the door and ventilators all opened wide, so that free dry air circulates and dries the foliage rapidly. Then the doors and ventilators are closed again,

and the still moist atmosphere again maintained. Many people think that the more water you give ferns the better, and that they specially enjoy being syringed. This is not so. They undoubtedly like an unfailing supply of moisture, but not too much of it, and though plenty of rain has no ill effect, but rather the reverse, in their wild habitat, that is because the water is being constantly changed, and as soon as the rain ceases the breeze shakes superfluous moisture off them and evaporation in the open air soon completely dries them. Under glass these conditions do not obtain. Your syringe leaves a superfluity of water in the fronds, for there is no breeze to shake it off, so it soaks into the leaflets and stagnates. The close atmosphere of the glass-house is saturated with moisture, so there is little or no evaporation, the consequence is that rotting or damping occurs, not perhaps in the most prominent or vigorous fronds, but in those of weaker growth, low and deep in the plant, crowded and shaded by stronger fronds or by those of adjoining plants, and once it starts in the weaker it may soon spread to the stronger; or a mouldy leaflet comes in contact with a fresh strong young frond just starting up, soft and full of sap, it at once becomes infected, the mould penetrates through it, and it falls over destroyed. This is not the only ill-result of over-head watering, for many ferns, though they will not easily "damp," become greatly discoloured, getting black or brown if water lies on them for even a very short time. This is most true of those whose foliage has a rough or dull surface. Those with a shiny surface stand water best as a rule.

The water then must be given to the individual plants, not poured or sprayed promiscuously over the whole lot. It should be given through the pipe of the watering pot without any "rose" on it, and given carefully so as not

(To be continued).

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ATHYRIUM F.F. CLARISSIMA AOSPOROUS CULTURE.



TRANSPLANTED INDIVIDUALS.

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EDITORIAL NOTES.

The Editor regrets that the regular sequence of publication of *The Gazette* has been interrupted by circumstances over which he had no control. The late Hon. Secretary's affairs being in bankruptcy the Society had no available funds for publication of the number due in May. As the bankruptcy proceedings are not yet closed it is premature to make any definite financial statement. At a Meeting of the Committee, held in London on June 28th, 1926, Dr. Stansfield was appointed Hon. Secretary and Treasurer *pro tem.*, and it was decided to issue a circular to all members of the Society asking for payment of all due and overdue subscriptions. A fairly good response has been made to this appeal and the Treasurer has funds in hand to carry on the work of the Society for the present. A considerable proportion of members, nevertheless, has failed to reply, and it is still uncertain upon how many paying members the Society can rely. It is quite clear, however, that if the work is to be carried on successfully more members must be obtained,

since the cost of printing remains approximately the same for a small or large number of members. There are signs in the horticultural press, at exhibitions, and elsewhere, that an increased interest is being taken in British Ferns ; and if only this interest can be transmuted into active membership the future of the Society is assured. We appeal, then, to our loyal members *to endeavour to secure recruits whenever possible*, and if only each member can secure one additional subscriber the Society can go on to increased usefulness and prosperity, *The Gazette* can be published regularly and more frequently, and can be increased in size ; also it may be possible to reduce the subscription to its former level.

Subscriptions for the year 1926-7 are now due and should be sent to the Treasurer, Mr. J. J. Sheldon, "Monkhams," Lower Road, Great Bookham, Surrey.

We have received from Dr. S. P. Rowlands another crested form of *Blechnum spicant*, which he has found as a small plant in the Pass of Llanberis this summer. It is a curious coincidence that the same hunter found a distinct crested *Blechnum* in Pembrokeshire in 1925. The latter is referred to in the report of the Annual Meeting this season. The new find seems to be on similar lines to the older one, but is too small as yet for a final verdict to be pronounced upon its character. A very important find was made in 1924, by Major Orme of Budleigh Sutherton, near that town. A frond was sent, through Dr. Druce of Oxford, in 1925, to the present writer, who identified it as *Asplenium marinum plumosum*, the most beautiful and distinct variety of that species. The plant is at present in the possession of the Editor, who was enabled to collect it *in situ* this year by the permission of Major Orme and with the help of Mr. J. Stuart Edwards : it will be carefully cultivated and preserved until fully developed. It is at present uncertain whether it will

differ perceptibly from previous finds of the variety, the first of which was made in Guernsey by Mr. C. Jackson more than fifty years ago. Similar forms have since been found in Devonshire by Mr. Jackson and Miss Price, but none has been recorded for many years before the present one. The species itself being a comparatively rare fern it is obvious that varieties of any importance must be regarded as greater treasures than those of species of more general distribution. Unfortunately *marinum* does not thrive under cultivation except in rather special circumstances, and there are very few collections of varieties of this *Asplenium*. It is hoped that *plumosum* may be preserved so that future generations may admire its beauty.

We have recently received from Mr. H. Stansfield some half-a-dozen very fine seedling *angulares* of promising *pulcherrimum* character. There are rumours of *pulcherrimums* in batches of seedlings in other collections. If these beautiful ferns cannot now be found wild it is evident that they are being raised from spores.

We have received a copy of *The Irish Times* for August 9th last, containing a report of the Flower Show in the Royal Dublin Society's Grounds in which occurs the following reference to British ferns :—"The group of fifty hardy ferns, for which a silver-gilt medal was awarded to the Rev. Canon Kingsmill Moore, D.D., including some of the rarest and most beautiful kinds, was generally conceded to be the best collection ever staged at a Dublin Show, a further six specimens in competition winning the medal presented by the proprietors of *Gardening Illustrated*."

OUR FRONTISPIECE.

The Society is indebted to Mr. T. B. Blow, the successful cultivator, not only for the photographs but also for the cost of their reproduction.

THE SEPTEMBER MEETING.

The 31st Annual Meeting of the Society was held on Monday, September 6th, at the Bull Hotel, Bridport, Dorset, the President, Mr. W. B. Cranfield occupying the Chair. The postponement of the date of meeting from August to September was found to conduce greatly to the convenience of members in travelling and in obtaining accommodation. The weather was good and the ferns in excellent condition. Members were present from Enfield, London, Welwyn, Reading, Horsham, Great Bookham, Warlingham and Canterbury.

The President made an opening statement with regard to the bankruptcy and resignation of the Hon. Secretary and Treasurer, Mr. C. Henwood, which had left the Society's financial affairs in an unsettled condition. The whole of the Society's funds up to June, 1926, were involved in the bankruptcy, amounting to £42 10s. 11d. A claim had been sent in for this amount to the Official Receiver. Mr. C. Henwood was confident that the Society's funds, being trust money, would have preference over the claims of other creditors, but this had not been officially confirmed. It remained to be seen how much would be recovered when the bankruptcy proceedings were closed. Dr. Stansfield had been elected by the Committee, Hon. Secretary and Treasurer *pro tem*. The President then referred to the work which had been done at Kew Gardens by a Sub-Committee of the Society (consisting of himself, Dr. Stansfield and Mr. T. E. Henwood) in reorganizing and naming the collection of British Ferns in the Royal Gardens. He had himself contributed to the Gardens a collection of British Ferns consisting of 237 species and varieties of the genera *Aspidium*, *Asplenium*, *Blechnum*, *Nephrodium*, *Osmunda*, *Polypodium* and *Scolopendrium*, which had been officially acknowledged by the

Director of Kew Gardens (Dr. Arthur W. Hill) on behalf of the Ministry of Agriculture and Fisheries. The Royal Horticultural Society had also put forward a request that the collection of British Ferns in the Society's Gardens at Wisley should be similarly overhauled and reorganized, and this would be done as soon as practicable.

Dr. Stansfield made a statement with regard to the Society's affairs since the books had come into his hands in June, 1926. The gross list of members then numbered 78. By direction of the Committee a circular had been sent out to every member of the Society inviting payment of all subscriptions due and all arrears. Forty-one members had paid their subscriptions up to the present time, but of these five had resigned their membership. Two members had died, leaving 35 who had neither resigned or paid. Several members had paid their subscriptions for the coming year. The members who had died were Mr. H. Relton and Miss A. Knox-Gore.

BALANCE SHEET.

F. W. STANSFIELD, *Treasurer, June 25th, 1926, to September 6th, 1926.*

RECEIPTS.	£	s.	d.	PAYMENTS.	£	s.	d.
Subscriptions ..	24	12	6	Printing and Postages	2	3	9½
				Balance in hand ..	22	8	8½
	£24	12	6		£24	12	6

BANKING ACCOUNT.

	£	s.	d.
Balance in Bank	21	1	11
Cash in Treasurer's hands	1	6	9½
	£22	8	8½

Audited and found correct this 31st day of August, 1926.

(Signed) J. J. SHELDON, *Auditor.*

The sum of £38 17s. 0d. was subscribed by the members present against the estimated loss to the Society.

OFFICERS FOR 1926-27.

President :

Mr. W. B. Cranfield.

Vice-Presidents :

Mr. Alex. Cowan,	Mr. J. J. Smithies,
Dr. F. W. Stansfield,	Mr. T. E. Henwood,
Rev. Canon Kingsmill Moore,	Mr. G. E. Stephens,
Rev. Canon Hawkins.	

Committee :

Mr. T. Brown, J.P., Belfast,	Mr. R. Whiteside, Lancaster.
Mr. T. B. Blow, Welwyn,	Mr. W. Wilson, Kendal.
Mr. P. Greenfield,	Dr. S. P. Rowlands, Doncaster.
Warlingham,	Dr. T. Stansfield, Reading.

Hon. Secretary and Editor of the Gazette :

Dr. F. W. Stansfield, Reading.

Auditor :

Mr. Percy Greenfield.

It was resolved that the next Annual Meeting be held on the first Monday in September, 1927, the place of meeting to be decided by the Committee.

Mr. T. B. Blow exhibited a remarkably successful culture of *Athyrium f.f. Clarissima* which he had raised by apospory, and kindly presented the plants raised to the members present at the meeting. Mr. Blow said that the aposporous frond had been given to him by Mr. T. E. Henwood, while Mr. Henry Mount had laid it down for him. The laying down of the frond so as to bring the pseudo-sori into contact with the soil without injury to any part was a piece of work involving great skill and patience on the part of the operator, and occupying many hours of careful work. A vote of thanks and of cultural commendation was passed to Mr.

Blow coupled with the names of Mr. T. E. Henwood and Mr. Henry Mount, who had contributed to the wonderful final result of the culture. Mr. Blow promised to contribute a picture of the culture as a frontispiece for the next *Gazette*.

Messrs. Perry of Enfield sent a collection of fern fronds for exhibition and were awarded Certificates for (1) *Polystichum angulare decompositum dissectum*, Perry, and (2) *Scolopendrium vulgare sagittato-crispum cristatum*, Perry, both very good things. The *angulare* was the finest form of *decompositum* we have yet seen and it will be difficult to surpass in the future. The *Scolopendrium* was also a neat and distinct variety.

Dr. F. W. Stansfield was awarded Certificates for (1) *Polystichum ang. pluma-Struthionis*, F.W.S., a seedling of his own from the *rarefactum* strain, and for (2) *Polypodium vulgare bipinnatum*, found by him at Dunster in 1914. Neither of these had previously been brought before the Society. *P. a. pluma-Struthionis* is, by some members, considered to surpass *Baldwinii* in fineness of sub-division as well as in depth and mossiness.

Dr. S. P. Rowlands was awarded a Certificate for *Blechnum spicant percristatum* found by him in Pembrokeshire in 1925. In this fern the terminal crests are small but neat and well formed, but the peculiarity is that the pinnae of both barren and fertile fronds are also furnished with small crests. This is a new feature in wild finds of *Blechnum*.

Most of the members stayed at Bridport from September 3rd to September 10th, and the surrounding country was scoured for varieties. Mr. Sheldon found, at Powerstock, a very promising crested form of *Lastrea filix-mas* (which may develop into a *grandiceps*), and, afterwards, near Beaminster, a very fine *angulare decompositum*, a large plant with several

crowns which involved a good deal of muscular exertion as well as considerable time before it could be removed. This plant was growing in a lane near a dwelling-house and was nearly buried in a heap of rubbish when found. Dr. Stansfield found a small ramo-digitate *Scolopendrium*, while Mr. Blow crowned the last day of our stay by bringing in, from the Axminster district, a very fine large-headed ramulose *Blechnum* of distinct character. Several other finds of minor importance were made, almost every member taking home some souvenir of his stay in the neighbourhood.

FERNS IN NORWAY.

In August, 1925, I had the pleasure of visiting Norway, in that splendid ocean yacht *The Arcadian*. Fern-hunting formed no part of the programme, but a ruling passion will assert itself, no matter what the foreground may be; and so it happened that, though I planned no fern hunts, I found a good many ferns. Wherever we landed, as we did in many places, from Molde nearly as far north as the South of Iceland, to Northeimsund, whose latitude is the same as that of the Shetlands, the ferns seemed to be welcoming me; they smiled up as we motored or drove, they greeted me as we walked.

Owing to the conditions of the cruise, my introduction to Norway and its ferns was fleeting and superficial, so much so that such observations as I made scarcely seem worthy of a place in *The Gazette*; but our Editor has commandeered my notes, and they must be placed at his disposal.

Quite surprising were the *Polypodiums*: not so much *P. vulgare*, which, though plentiful, was not especially vigorous; but it was sheer delight to wander at Aandalsnaes through woods where *P. phegopteris*, *P. dryopteris* and *P. calcareum* rose above the ankles, and, in some cases,

halfway to the knees. I have found these *Polypodies* often in Switzerland and Wales, but have never seen anything to approach their profusion in Norway.

Of *Pteris aquilina* there was plenty, and the same may be said of *Athyrium filix-fœmina*. *Blechnum spicant* also was common ; but, so far as my observation went, none of these three species luxuriated as they do in our Islands. *Aspleniums* were rather scarce. *A. trichomanes* and *A. septentrionale* were found, but curiously enough not *A. ruta-muraria*, nor *A. Adiantum-nigrum*. *Scolopendrium vulgare*, I believe, I saw from a motor, but undoubtedly it was scarce ; I met some *Lastrea oreopteris* and was shown *Woodsia Ilvensis*, which a lady member of the party found. No *Polystichums* crossed my path ; but *Lastrea filix-mas* was plentiful.

Notice has often been taken of the absence of “ Varieties ” on the Continent. Possibly the absence of searchers may explain this. At any rate I can claim to have found a forked *Lastrea filix-mas*. It was a poor form, one which would not attract a second glance at home ; but it was certainly sufficiently “ in character ” to prove that the Continent does produce “ Varieties.”

On the whole Norway impressed me as a land which offered good fern hunting. My searches were of so perfunctory a kind that, if ferns had not abounded, I should not have made “ finds ” in any sense of the word.

H. KINGSMILL MOORE.

POLYSTICHUM ACULEATUM AND ITS VARIETIES.

The prickly shield fern, in its normal form, is certainly one of our handsomest species. Its glossy dark green fronds are quite distinct from those of any other British fern, and it is frequently collected and grown in cottage gardens, etc.,

by people who have otherwise very little discrimination among ferns. Its thoroughly evergreen character makes it a handsome object in the winter when most other outdoor ferns have either disappeared or are seen only as unhappy dragged objects. It has a wider range of distribution than *P. angulare*, being found both further north and further east than its softer ally. Notwithstanding its almost general distribution in the British Islands it has been much less prolific in varieties than its relative *angulare*, the wild finds in the latter species outnumbering those in *aculeatum* by hundreds to tens. We well remember the time when practically the only *aculeatum* varieties known were *acrocladon*, *densum*, "*proliferum*" and "*cristatum*." Of these the last was not a *cristatum* at all, but only very slightly forked (not always even that); *proliferum* was not proliferous or only very rarely so, but was a decent acutilobe; *acrocladon* was really a *grandiceps* and came rather near to *angulare*; *densum* was a fine bold form like a normal *aculeatum* with larger pinnules. It is still well worthy of a place as a garden fern. The first really crested *aculeatum* (apart from *acrocladon*) was *cristato-gracile*, found by the late Mr. T. Bolton, Senior, in 1865. From this some quite good crested forms were raised by Mr. Bolton and others. It was not until 1876 however that the great find in *aculeatum* was made, i.e. *P. a. pulcherrimum*, Bevis. This was really an epoch-making fern, although it was not until long afterwards that the splendid *gracillimums* and improved *pulcherrimums* appeared as its glorified offspring in the hands of Mr. Druery and Mr. Green. It was for many years supposed to be entirely barren. The present writer and the late Mr. S. Cropper were the first to find spores (two or three *sori* only) on *pulcherrimum*—about 1882 I think—but from them nothing was raised superior, or even equal, to the parent. Sometime in the late nineties of the last century, however,

Mr. Green of Acton had a very fine plant of *pulcherrimum* which produced a large crop of spores, and from them both Mr. Green and Mr. Druery raised *gracillimums*. Mr. Druery was first in the field with *gracillimum* and received a First Class Certificate from the R.H.S. for his plant. Mr. Green shortly followed with his *pulcherrimum plumosum* which, although really a finer thing than *gracillimum*, only received an Award of Merit. The *gracillimums* are still exceedingly beautiful things and very valuable for culture under glass, but unfortunately in most places they are failures as outdoor ferns ; in fact we do not remember to have ever seen a plant doing really satisfactorily in the open air. Green's *plumosum*, however, although it is much richer and more developed in character than *gracillimum*, does well in the open air. Another of Druery's seedlings was his *pulcherrimum* (which at first he called *dimorphum*). This is second only in beauty to Green's *plumosum* and is also a good grower in the open air. It is thicker in texture than the original Bevis and has more of the glossy surface and rich green colour of *aculeatum*. It is certainly one of the very finest and most effective of British ferns. It was never submitted to the judgment of the R.H.S. but has been awarded a Certificate by the British Pteridological Society and has been figured, somewhat inadequately, in *The Gazette*—Vol. III., p. 123. More recent than *pulcherrimum*, although a long way behind it in quality, are two forms of *aculeatum*, both found in the same district as *pulcherrimum*, and both on one excursion of the Society in 1921, viz., *revolvens* and *brachiatum*. *Revolvens* was much withered when found (in a very dry year), had only part of a frond, and was at first supposed to be *angulare*, but on cultivation turned out to be *aculeatum*. After a year's growth it apparently dropped the *revolvens* character and was consigned to the rubbish heap as a rogue. Fortunately spores had been sown the previous year and the

seedlings were accidentally preserved although given no care. In the spring of this year they made plants and seemed to be all of true *revolvens* type. The leading plant up to June, then bearing fronds of 12 inches in length, showed the character better than we remember to have seen it in any species. The later summer fronds were flat, or nearly so, and it seemed likely to be another disappointment. It is, in autumn, again producing revolvant fronds. Several of the other plants, however, have retained the character all through the season, and we hope that some, if not all, will be true *revolvens* next year. *P. aculeatum brachiatum* was very fine when first found, having great basal pinnae making the width of the frond at the base almost equal to its length. The following year, too, the main crown sent up fronds of true brachiate character, but since then it has produced no really characteristic fronds although the pinnules show the peculiar cutting of a *brachiatum* and an occasional pinna is "armed." It remains to be seen whether it will return to its original character when really established, as frequently happens among the brachiate *angulares*. Probably the air of Dorset or Devon would be a help. Seedlings raised from it are quite deltoid even in a very small state, and have also the finely cut pinnules of a *brachiatum*, but so far they are not "armed." The late Mr. E. J. Lowe and Mr. E. F. Fox raised some very fine forms of *aculeatum* by crossing varieties of *angulare* with *aculeatum densum*. Mr. Lowe thus raised *aculeatum cruciatum* and Mr. Fox *aculeatum capitatum* and *polydactylum*. Mr. J. Edwards also raised a *plumosum* from *pulcherrimum*, Bevis, which, in his hands, sported in the opposite direction from that taken in the hands of Mr. Druery and Mr. Green. In 1924 Mr. T. E. Henwood found, near Axminster, a crested *Polystichum* which, although it had only one frond and was severely punished by drought, was supposed to be rather a catch in *angulare*. In 1925 it

came up rather freakish in character, with the creasing very unequally disposed, but was evidently an *aculeatum*. This year it has settled down into more regular habits and promises to be quite a good crested *aculeatum* of a new type. Spores were sown in 1925, from which seedlings are now producing fronds, and there is hope that they may show some variation from the parent, so that possibly a new strain of crested *aculeatum* may result from this find.

There is still room for new varieties in this species: for instance a really good divisilobe would be an acquisition of great value. No doubt this and others will arise sooner or later.—F.W.S.

FERN HUNTING IN NORTH WALES.

After having spent numerous holidays in South Wales, where ferns are abundant but somewhat restricted in variety, it was a pleasant change to visit North Wales and to see some of the less common species.

A late arrival at Chester, at 9 p.m., was followed by an exhilarating pillion ride to Llansannan, a village tucked away in the heart of Northern Denbighshire, some nine miles west of the quaint old town of Denbigh. The mountain roads in these parts are none too good, but hold no terrors for the modern, highly efficient motor cycle, and we covered the forty odd miles in less than two hours.

My friend and I began our holiday by exploring suitable places near at hand, and surely there are few more pleasant spots, or more deserving of the term "Fern Paradise," than the Valley of the Aled. This, in its upper and more interesting part, extends southwards from Llansannan for some four miles. It ends, or rather begins, at a magnificent waterfall, known in the pleasant Welsh language as Rhaiadyr-y-Bedd, where the stream from a mountain lake, the Llyn Aled,

rushes down a precipice into a pool below. The small river is continued down a heavily wooded gorge in a northerly direction, winding its way between dripping rocks, past moss laden trees, and so beyond Llansannan till it joins the Elwy on its way to the sea. Among the ideal conditions of this valley, Broad Bucklers and Lady Ferns attained their utmost development, and it was among these beauties, at the foot of the waterfall, that we boiled our kettle and ate our meal, forgetting the troubles of life.

No, we did not find *Trichomanes radicans* here, nor even *Hymenophyllum*, though a spot more suited to both can hardly be imagined. The former, needless to say, was not found at all, but the Filmy Fern turned up another day, in the southern part of the County, growing in its favourite situation on damp rocks just above the river bed, often in company with mosses, with *Asplenium viride* near by. *Hymenophyllum unilaterale* was the only species seen, though doubtless further search would give *Tunbridgense* as well.

The prevailing formation in the Llansannan area is a sort of slate, known geologically as the Wenlock Shale. This is varied in parts of the County by masses of limestone, as in the case of the Cefn Rocks in the Elwy Valley, and the Llysfaen Rocks on the North Coast. The Hart's tongue is not abundant in the slaty areas, even on mortared walls, but is of course more plentiful in the limestone region. In one spot, especially, this fern was particularly plentiful and luxuriant, some of the fronds being little short of a yard long. In one restricted area, along a small stream, *Polystichum angulare* was found growing in large numbers for about half-a-mile. Immediately above and below this area *angulare* was abruptly replaced by typical *aculeatum*, and in no place did I find the two species mixed. The geological formation and the surrounding conditions were apparently similar

all along, and I am personally unable to account for this sharp demarcation in the habitats of the two species. Among the interesting flowering plants that we met with were *Lithospermum purpureo-caeruleum*, and masses of the rare *Veronica hybrida* of Linnaeus, a plant differing in small details from the very rare Eastern form, *Veronica spicata*.

A particularly interesting day was spent on Snowdon. The weather was perfect, and the crowds waiting at the mountain station at Llanberis made it useless to try and ascend by train. So we rode back two or three miles to the top of the Llanberis Pass, in order to climb the mountain from the Capel Curig, or eastern, side. It was as well, perhaps, that we did this, for on the way up the Pass I found, almost smothered by a clump of Parsley Fern, a neatly crested *Blechnum*, again showing some signs of percrustation and thus resembling my North Pembrokeshire find of last year. Some three hours was spent in the ascent of Snowdon, varied by a meal halfway up, and frequent deviations from the pig track in search of botanical treasures. Fern species became fewer as we ascended. The *Blechnum*, etc., of the lower slopes was soon almost replaced by the Parsley Fern, which was particularly abundant, but the Beech Fern and *Asplenium viride* were also found, while it was our fortune to see one splendid plant of *Polystichum lonchitis*, which solitary find was allowed to remain to carry on the good work of scattering its spores. Long may it be allowed to stay there.

The Fern Allies were represented by *Selaginella*, *Lycopodium alpinum*, *L. clavatum* and *L. Selago*. *Isoetes* and *Pilularia* are reported from the lakes below, but we had no time to search for them.

Perhaps the tit-bit of the whole holiday was *Lastrea rigida*. It is not apparently generally known that this fern occurs

in Wales, but through the kindness of a friend, we were able to see it in its Welsh habitat. Here, on an exposed hillside, it grew freely in company with *Polypodium Robertianum*, and, judging by the original description, it had apparently more than held its own during the sixty years that have elapsed since its discovery. Its area was very restricted, and this was at first somewhat puzzling, till one saw a sphagnum covered area immediately below, where water oozed out of the cliff. The ferns were, in fact, growing on a miniature "Moraine," with a fairly constant supply of moisture not far below the roots. This would obviously explain the fern's survival on scorching rocks facing west, and its absence from the dry areas on either side.

In some of the deep, shady ravines the Oak and Beech Ferns were found in plenty, along with lesser quantities of *Cystopteris fragilis* and *Asplenium viride*. These are all scarce ferns in the Southern Counties of Wales, as is *Cryptogramme crispa*, so plentiful on the slaty rocks of Snowdonia and elsewhere. *Polypodium vulgare* grew in hundreds on some of the hedges, but by far the commonest hedge fern was *Lastrea filix-mas*, although a good deal of the *pseudo-mas* form was also seen in places. *Athyrium*, *Blechnum*, *Lastrea dilatata* and *L. montana* were often abundant. *L. aemula* and *L. spinulosa* were looked for in vain, but of course occur, more especially perhaps in Carnarvonshire. *Scolopendrium* and *Polystichum angulare*, which monopolise the hedges in some parts further South, were conspicuous for their absence in most of the areas we explored, being only very locally abundant, although *P. aculeatum* was somewhat more plentiful. *Asplenium lanceolatum* we hardly expected to find, and did not, though it certainly occurs in Carnarvonshire if not in Denbighshire as well. Our only real

disappointment was the failure to find *Asplenium septentrionale*. A strenuous day was spent hunting for it in one of its Carnarvonshire localities, but the only result, as far as I personally was concerned, was a sting, after falling into an angry swarm of wild bees. The lesser wall ferns were not as abundant as I should have expected. The *Ceterach* was only seen in plenty once, and *Asplenium trichomanes* was not nearly as abundant in Denbighshire as I have seen it elsewhere. The commonest was undoubtedly *ruta-muraria*, plentiful on most walls and even on the hillsides, apparently indifferent as to whether it grew on lime or slate.

A fortnight is obviously too short a time to make any but a superficial survey of the fern beauties of so large an area, but every minute was enjoyed to the full, and we left with a determination to visit North Wales again in the near future. In the meantime, we must be content with dreaming of *Woodsia* and *Asplenium germanicum* and other treasures, leaving the finding of them for that pleasant time to come !

OUR DUTY TOWARDS FERNS.

The refinding of *Asplenium marinum plumosum* by Major Orme is a reminder that we owe something to the choice things which come into existence apparently for our edification and pleasure. If this be not their purpose it is difficult to imagine any other since the more extreme developments of variation have little chance of continued life unless they are given shelter from the fierce struggle for existence which obtains in wild nature. This is more especially true with regard to those ferns which have lost that faculty of propagation by spores which gives the normal species their power of colonization. A barren fern obviously cannot spread except by vegetative growth, which is so slow and difficult a method that it is clearly only a matter of time before any

individual plant will cease to exist. It may be devoured by slugs, snails, wood lice, weevils, ants, mice, rabbits or cattle. It may be pulled up by birds, to be used as nesting material, or it may be overwhelmed by a fall of rock or landslide, or be washed away by a flood. It may very easily be destroyed by drought in a dry season. If growing in a hedge it may be chopped to pieces by the hedge-cutters, or its very site may be wiped out by the "improvement" of a road. We have in mind quite a number of finds which were on the verge of extinction when discovered. One, for instance, was hanging, head downwards, from a bank, its crown being in the air, and the plant only anchored by the tips of a few roots in the soil above. Several have been so punished by drought, competition and accidents that it was a difficult matter to revive them even with all the resources of cultivation. The late Mr. Moly wrote to Col. A. M. Jones : " I found the first (*angulare pulcherrimum*) in 1862, and, on the same day, I found another of which (as the first was a far better specimen) I contented myself with taking only a frond, but, on cogitation at home, I found so much beauty in it that, a week or two afterwards, I railed again to the town, and, on reaching the spot, my nerves received a shock on perceiving that the vandals had removed all the soil from the hedge where I had left it ! Every year since I have made a pilgrimage to the neighbourhood in the hope of securing a specimen (for the original plant I had given to Mr. Wollaston and it had died) ; my efforts were, however, unrewarded until the summer of 1876, when I found the one I now possess." It is to the efforts of that mighty hunter and skilful cultivator that those two magnificent ferns, " Moly's Green " and " Moly's Variegated " *pulcherrimum*—still almost supreme ornaments in the choicest collection—owe their continued existence. Not only these, but scores of other beautiful things which enrich our gardens, are the outcome of many

years' work by "queer old Moly" as some people called him. Moly was therefore a benefactor not only to ferns but to fern lovers. We owe a deep debt of gratitude to Moly, Padley, Wills, Jackson, Wollaston, Jones, Barnes, Smithies, Forster, Whitwell and many other workers of the past and some of the present day. There is much to be said for the practice of attaching to a variety the name of the finder, or raiser, which is prevalent among fern lovers more than in any other section of botanists.

We owe also a debt of gratitude to the ferns themselves which have put on their superior attire for our special gratification, and the least we can do is to give them a good time and enable them to display their plumes to the best advantage. This they can rarely do except as the result of cultivation and, indeed, the difference between a "find" when growing wild and the same plant under good cultivation is often a revelation even to the finder. This is markedly the case among the plumose section of varieties, which require abundant nutrition and freedom from worries to attain their full development. Lastly, we have a duty to posterity to preserve intact the heritage of beauty which has come down to us from the efforts of past workers as well as that which we ourselves had a part in saving from destruction. Let us then strive to do our ferns full justice as far as possible. We cannot all grow full collections of beauties: that must be reserved for the comparatively wealthy and for public gardens such as Kew and Wisley. The very poorest can, however, grow at least one fern in some corner or other, and, if we can only grow a single plant, let us see to it that it has the opportunity to grow to its highest development and to show its full beauty.

AMATEUR FERN GROWING*(Continued).**(Reprinted from Irish Gardening).*

to wash the soil away from the plant. The best way is to water, not the plants, but the rocks—the force of the flow is thus broken, the soil is not disturbed, and the plants are watered just as well as if it was poured direct into the “pocket.” This saves time too, for the same care is not required—the water flows all over the stone and waters all the pockets that surround it.

Again, when watering do it liberally, give a good saturating, and then leave it alone for a few days. In very hot mid-summer weather it will be all the better to water every evening, but if for any reason it is inconvenient or impossible to do so, no harm will result, they will go for three or four days even, at that time, without suffering. In spring, when growth is commencing, a good watering once or twice a week is enough. In autumn once a week or ten days is plenty, unless there is some very hot dry weather, when they should be watered about three times a fortnight.

It will be seen therefore that the labour of watering is not very deadly.

In one corner of the house a dipping tub should be provided, not only for the convenience of dipping the can to fill it, but in order that, being kept full, you have a supply of water near the temperature of the house, so that the plants are not chilled by the cold water fresh from the supply pipe. If the supply laid on to the house is “soft” like the Vartry water supplied to Dublin, it may be freely used for all purposes; but if it is “hard”—that is, contains a quantity of dissolved lime—it should not be used. It will be necessary then to make provision for catching the rain-water from the roof.

either in a series of tubs or in a large cistern, made by sinking a hole in the floor and lining it with cement. This is a laborious and costly job, and keeps the water really cooler than we would like it. A couple of paraffin barrels cut in half will make four serviceable tubs, which will give a sufficient supply. These may be all connected together, either near the bottom, by a short straight piece of lead pipe, or, better, near the overflow level at top by a bent lead pipe which reaches from the bottom of one to the bottom of the other. This acts as a syphon and keeps the water level the same in all four tubs. It is better than the former method, as there it is very difficult to prevent a leak, which will drain the tubs; where the connection is made above, a small leak is no harm, as it can only occur when the tubs are already full. If the syphon gets air-blocked, an awl hole at the upper part of the bend will at once correct this, the hole being then plugged by a bit of wood.

Ventilation is the next consideration. The first general principle is that ferns dislike a draught, but rejoice in still air. Second, they dislike dry air and rejoice in a moist atmosphere. Third, they dislike changes of temperature: the greater these are, and the more rapid, the worse. Fourth, that these likes and dislikes are much more pronounced in the "growing" period of the year—that is, when the ferns are making fresh new fronds, than in the "resting" period, when the fronds are fully developed. With these four principles understood and kept in mind, the whole question becomes simple.

About the middle of February, especially in open seasons, the ferns begin to make their new roots, but nothing is yet to be seen in the crown growth. Early in March some loosening will be seen in the crown of curled-up young fronds, which soon then begin to unfold. Just at this time we fre-

quently have a clear sky and bright sun, but cold, dry east wind. Some glints of the sun reach portions of the glass-house, heat rays as well as light rays pass through the glass, but heat rays cannot pass out again, and the atmosphere within rapidly warms. The day is, however, still short, and the evening, night and early morning, are bitterly cold. If we are not careful the temperature will rise rapidly every sunny day, but every night will fall as low as that outside. The warmth induces the ferns to start into growth, and once started they tend to continue growing, but the young delicate succulent fronds will be perished and distorted if subjected to the cold at night. If we open wide the ventilators during the sunny hours, the cold wind entering will cause worse havoc. How can we get rid of these dangers? First, do not start the ferns too early—by premature watering and getting the temperature up too early. Second, when the season is more advanced, endeavour to keep the temperature moderate during sunny hours, and box up the heat for the other hours. To do this, keep all the lower ventilators tightly closed day and night; during the sunny hours keep the top (roof) ventilators open about one inch. Heated air tends to rise, and so it rushes out through the small apertures you have given it at the ventilators, through which little, if any, draught will make its way in to cause damage. The heated air which rushes out is replaced by cool air filtered in through innumerable chinks under and over the door and ventilators, between the panes of glass, etc., so no draught is caused, but the temperature is kept moderate. As soon as the sun is going off the glass the top ventilators are closed, and the heat bottled up as much as possible. Though it falls appreciably, it remains above that outside, for a long time, probably, unless there is cold high wind, till the sun of next day warms it up again. Even on a dull day, it will be found that the temperature inside the house will rise, for still some heat-rays

make their way in, though they are much enfeebled, the temperature in consequence does not tend to become excessive, therefore on a dull day we keep all ventilators closed, and bottle up all the heat we can. This course is adopted all the time of active growth, and as the sun grows stronger, we further moderate the heat by frequent wetting of the floor, which promotes evaporation, and evaporation always means cooling. Before midsummer it may be necessary to further prevent overheating by shading. This must be done on the outside of the glass, and if the house has a north aspect, the roof alone requires to be done. Do not use an oil paint—that is, a permanent shading, as it is unnecessary, and becomes dirty and opaque.

When the growth has become mature, the days have become long and the nights short, the top ventilators may be left open one inch day and night, and during the hottest part of the day the lower ventilators may be opened pretty freely on the sheltered or non-windy side of the house, and the floor still kept wet. As the days shorten in autumn we give less water, and so gradually get the house drier, the floor water is given up, air still given and left on longer, to harden the foliage against the winter struggle. By the time November has arrived we have given up watering altogether, the lower ventilators are kept closed day and night. The upper ventilators remain open about half an inch day and night. This is not for the purpose of regulating temperature, which keeps practically the same as that outside, but to promote further drying and so diminish the tendency for moisture to condense on the cold glass, and drip down on the ferns, where it would at once set up decay. By this time, if we desire, we can take a trip ourselves to sunny climes and revel in their warmth. The ferns will look after themselves and be quite contented and happy till we come back at the

end of January. But if instead we spend Xmas at home, and wish to deck our dinner table with something of fairy lightness, to relieve the customary holly and ivy, we go to the greenhouse, as we have often done in other winters, and pluck a handful of maidenhair, fresh and green and dainty.

A word may be said about artificial nourishment. If the directions as to furnishing good soil for the plants have been followed, they will continue to flourish for many years without any additional nourishment. If, however, it is seen that here and there the soil has become washed away, or the roots are exposed by the upward growth of the rootstock, a top-dressing of one part loam and two parts leaf-mould, will be advisable. In the case of strong vigorous growing kinds, a few waterings once a week during the growing season with water to which some Clay's Fertiliser has been added overnight, in the proportion of a small teaspoonful to a gallon of water—that is, a very weak application—will give great stimulus to growth, and will diminish the robbery of nourishment by this strong grower from its weaker neighbours. But if the plan for collecting rain-water from the roof is adopted, no additional artificial stimulant will ever be required. The soot and dirt washed from the roof will supply all that is necessary; it is given constantly in very weak solution, and will cause a healthy vigorous growth, and rich green in the foliage, that cannot be surpassed by any other line of treatment. If, however, the supply pipe is depended on rather than the roof-water, then fill a bag with soot, tie a brick to it, to sink it, and put it into the dipping tub. Renew it every six months or so. This is the finest of all "manures" for ferns.

We now have our fernery going splendidly, and there seems little to do except to go and admire the plants, and

(To be continued).

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F. W. STANSFIELD, M.D.

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THE BRITISH FERN GAZETTE.

NEW SERIES.

VOL. V.

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EDITORIAL NOTES.

The President of the Society and the Editor of *The Gazette* have been elected Fellows of the Linnæan Society on the initiative of our member Mr. T. B. Blow, who is himself one of the oldest Fellows. Two more or less public lectures on British Ferns have been given by members of our Society during the winter and spring. We give, on another page, a short resumé of our President's address to the Horticultural Club. The other lecture was delivered by Dr. S. P. Rowlands to the Doncaster Scientific Society early in December, and was also illustrated by lantern slides lent by our President, whose kindness in the matter was suitably acknowledged. The lecture was briefly reported in the local press. Several new members have joined the Society since our last issue, but there is still need for the activity of the "Recruiting Sergeant" as our circle of members is very small compared with that of societies of specialists in other branches of horticulture and botany, such as roses, carnations, irises, etc.

The Treasurer, Mr. J. J. Sheldon, will be glad to receive payment of all due and overdue subscriptions. The Editor will also be glad to receive literary contributions from members for the next number of *The Gazette*: the greater the variety of contributions, the better is the general flavour of the issue.

THE SEPTEMBER MEETING.

The Annual Meeting of the Society will be held at the Peerless Hotel, Tenby, Pembrokeshire, on Monday, September 5th, at 10 a.m. Accommodation may be had at the Royal Gate House Hotel (6 guineas per week per head), at the Peerless Hotel ($3\frac{1}{2}$ to $5\frac{1}{2}$ guineas) and with Mrs. Arnett, 7 Norton, Tenby (from $3\frac{1}{2}$ guineas per week). Members who intend to be present are advised to write and secure rooms at the earliest possible moment as otherwise it may be difficult to obtain suitable accommodation. The County of Pembroke should afford good ground for our purpose as, although it has been very little hunted in the past, several good things have been found there, e.g. *Polystichum ang. grandiceps*, Jones, and, as recently as 1925, Dr. Rowland's *Blechnum sp. percristatum*. The southern half of the County is on the limestone and abounds in *Polystichums* (both *angulare* and *aculeatum*), *Scolopendriums* and other lime lovers, while the northern part is on the millstone grit and coal measures and contains *Blechnums* and other *calcifuge* species. The general botany of the County is interesting and the Society will have the advantage of the advice and assistance of Mr. J. E. Arnett, who is the local authority on botany. We look forward to a pleasant time and hope to have a good attendance of members.

OBITUARY.

On November 19th, 1926, very suddenly, at Reading, Jane, the beloved wife of Frederic Wilson Stansfield.

“SHE WAS MINE.”

“Thy tears o’erprize thy loss ! Thy wife,
 In what was she particular ?
 Others of comely face and life,
 Others as chaste and warm there are,
 And when they speak they seem to sing ;
 Beyond her sex she was not wise,
 And there is no more common thing
 Than kindness in a woman’s eyes.
 Then wherefore weep so long and fast,
 Why so exceedingly repine !
 Say, how has thy Beloved surpass’d
 So much all others ? ” “She was mine.”

[From “*Florilegium Amantis*,” Coventry Patmore, by special permission of Messrs. George Bell & Sons, London.]

**MENDELISM IN FERNS AT THE JOHN INNES
 INSTITUTION.**

We have received a copy of a paper (reprinted from “*Hereditas*,” an international scientific journal published in Sweden) by Miss Irma Andersson of the John Innes Horticultural Institution, Merton, Surrey, which will be of interest to fern growers both from the scientific point of view and, perhaps still more, as an illustration of the cultural methods employed by Miss Andersson. There is nothing unexpected in the fact that the characters of British fern varieties are inherited on Mendelian lines as are the characteristics of practically all the higher plants and animals so far as has yet been investigated. Some of the facts brought out in

the course of Miss Andersson's experiments will, however, be a little surprising to some of our readers. First of all, with regard to methods of culture :—The spores are sown not, as a rule, on soil, but on a thin layer of agar-agar jelly moistened with Knop's solution in petri dishes. These petri dishes are small flat glass dishes about half-an-inch deep and two or three inches in diameter, having closely fitting flat glass lids. The sowing is done in a small special room, with glass walls and closely fitting glass doors, which is regularly sterilized every day. The tables are glass covered and kept scrupulously clean, while all instruments are sterilized before being used. The agar jelly has the advantage over soil that it is transparent, and therefore the whole dish and its contents can be examined under the microscope and every detail of structure and development can be kept under close observation. We have visited the Institution and inspected the processes of culture. Some petri dishes, said to be "very old," were examined and found to be full of prothallia mostly showing primary fronds of the sporophyte generation. There was not a trace to be seen of confervæ, protococcus, protonema of mosses, hyphæ of moulds, nor foreign growths of any kind—nothing but fern prothallia with incipient fronds growing upon the clear transparent jelly. We quote now from the pamphlet :—"In order to ensure cross fertilization each single prothallium is transferred to a separate petri dish and it can, of course, be seen when the archegonia are ready for fertilization. The petri dish is then filled with Knop's solution and prothallia with antheridia of the proposed male parent are added. Twelve hours is usually long enough to effect fertilization. The solution with the male prothallia is then removed. The hybrid usually appears a week or two after, and, when the roots and cotyledon are well developed, it is transferred to soil. The prothallium of *Polystichum angulare* and *Scolopendrium vulgare* is, at

first, either male or asexual. This stage is followed by a period of growth, after which the archegonia appear at the usual place. When the archegonia are ready for fertilization the antheridia are, as a rule, empty. This applies to the normal, regularly formed, more or less heart-shaped prothallium. It is, therefore, often necessary to keep a prothallium for a considerable time in order to secure self-fertilization as new lobes or outgrowths must develop which are covered with antheridia."

Experiments with *Polystichum angulare*.

Spores were sown from a plant of *P. a. inæquale variegatum*, the object being to investigate the phenomena of inheritance of variegation. In the first instance the spores were sown on soil and a family was raised consisting of 158 plants of *inæquale variegatum*, 50 plants of *P. a. congestum*, 63 plants of *P. a. grandidens*, and 14 of *P. a. grandidens congestum*. These numbers correspond closely to those which would be expected upon Mendelian principles supposing the spores sown to have been from a cross-bred plant in which the *variegatum* character, with normal outline, was dominant, and the *congestum* and *grandidens* characters recessive and consequently concealed. The ordinary amateur or commercial raiser of ferns for garden purposes would at once suspect that stray spores had somehow got into the sowing, and this was our own idea upon first reading the account of the experiment. We all know how readily stray spores will filter in, apparently from nowhere, often of other species than the one sown and not unfrequently when no plant of the kind is known to be in the neighbourhood. Almost every raiser of ferns from spores has met with perplexing experiences of this kind. In the experiment in question however *no other species than the one sown* appeared and there were no "weeds" such as confervæ, mosses or moulds,

which was strong evidence that the precautions taken to exclude foreign spores had been effective. The Mendelian proportion of numbers was also significant. In order to make assurance doubly sure another experiment was made, in which one sorus at a time was picked off the frond under a microscope. Then one single sporangium, unopened at the time, was dissected out by using absolutely sterile needles. The single spore-case was then transferred with the needle to a sterile hollow glass slide and was immediately scrutinized on all surfaces to ascertain that no spores from other sporangia adhered to the wall or the stalk. A sterile glass ring was then put round the sporangium and a sterile cover-slip was put over the ring. The cover-slip was slightly heated so as to induce rapid bursting of the sporangium. When this had taken place the glass ring and cover-slip were carefully removed and the, now free, spores transferred to dishes of agar. The whole procedure took place in an otherwise empty room which is regularly disinfected and affords absolutely sterile conditions. Afterwards the agar dishes were kept in a greenhouse on a table isolated by strong disinfectant, the dishes being kept shut. In this experiment the spores from 24 sporangia were sown on agar, the contents of each sporangium in a separate dish, and the prothallia were allowed to fertilize among themselves. Each sporangium, so prepared, gave the four types of ferns as in experiment I, and in similar proportions. When the spores from these four types were sown separately and allowed to fertilize themselves it was found that the dominant type (*inæquale variegatum*) again gave rise to a smaller proportion of types 2, 3 and 4, but when the recessives *congestum* and *grandidens* were sown they either bred true or gave type 4, i.e. *grandidens congestum*, the dominant being entirely eliminated. All this is again exactly what would be expected on Mendelian principles. The only possible

explanation of these results is that the spores originally sown were from a cross-bred plant in which the *variegatum* character and normal outline were dominant, while *congestum* and *grandidens* were recessive and therefore concealed. Had spores from the original *wild-found* plant of *inæquale variegatum* been sown they would, doubtless, have either bred true or have given a proportion of normal *angulare*. A number of experiments were made by crossing different varieties of *Scolopendrium vulgare*, most awful-looking mongrels being produced in some cases (especially where *periferens* was one of the parents), but always the results were on Mendelian lines and the most complicated mongrels could be resolved into their constituent varieties by breeding and selection. It is found in this species that branching is recessive to non-branching, dwarfness is recessive to tallness, undulation is recessive to flatness; but murication of the upper surface is dominant over the smooth surface. Margination (of the under surface) is also dominant to smoothness.

In *Athyrium filix-fœmina*, apparently, a cross-bred parent, containing the elements of *kalothrix*, but not showing any *kalothrix* character, had been obtained, since, from a ragged-looking *laciniatum*, the forms *kalothrix laciniatum*, *kalothrix cristatum* and *kalothrix-Craigii* had been obtained. It is evident that the thin translucent *kalothrix* character is recessive to the thicker texture of other varieties. The late Mr. Druery had a similar experience when, in trying to obtain a crested *kalothrix* by sowing together *kalothrix* and *percristatum*, Cousins, he obtained, apparently, nothing but *percristatum*. Afterwards however a seedling *kalothrix cristatum* came up self sown in his fernery, and he logically concluded that at least one of *percristatum* seedlings must have contained *kalothrix* "blood," or more properly, *kalothrix* determinants in the germ plasm.

The common or garden raiser of ferns will be able to learn several valuable lessons from Miss Andersson's experiments, and, perhaps still more, from her methods of working. It is obvious that, by using precise scientific methods and with the assistance of the microscope, it will be possible to exclude weeds and stray spores from sowings. Also it will be practicable to obtain fertilization of the archegonia and production of fronds from prothallia more quickly and more certainly. The crossing of varieties and the hybridization of species will become almost as easy as in the case of orchids and other flowering plants, and it may become possible to raise from spores varieties and species which have hitherto resisted this method of propagation, such as *Lastrea remota*, *Asplenium*, *Ad.-nigrum microdon* and *Asp. trichomanes confluens*. In short, in all cases of difficulty of propagation it will be easier to ascertain the cause and consequently to surmount the difficulty.

Readers who are unfamiliar with the work of Gregor Mendel may with advantage read a little book on "Heredity in the light of recent research," by L. Doncaster, M.A., published by the Cambridge University Press, in which the subject is succinctly explained.

F.W.S.

LASTREA F. MAS VARIEGATA, PHILLIPS.

The history of this fern is somewhat obscure. It is presumably the same variety which is referred to in Lowe's small book on British Ferns as "*Nephrodium f. mas argenteum*, Phillips, a white-variegated variety found in Ulster by Mr. Phillips." It is not mentioned in any other book on British ferns to which I have access. A small plant of it was given to the writer when he was on a visit to Mr. Phillips at Holywood in 1912. Mr. Phillips had forgotten the circumstances of its origin, but supposed it

to be a wild find of his own. The little plant, at the time, was not in good health and was rather indistinctly variegated with dull greenish yellow. It showed no other abnormal character than variegation. On cultivation, however, it turned out next year to be polydactylous as well as variegated and the variegation assumed a more definite character. It is exceedingly unlikely that a fern having both these abnormal characters would be found wild. From its appearance I judge it to be a cross between Miss Wright's *lux-lunæ* and *polydactyla*, Dadds. The coloration is exactly of the same moonlight shade as in the former fern, but it is more evenly distributed than in the supposed parent, for, whereas in *lux-lunæ* there are splashes of moonlight over the fern (as if the moon were shining through drifting clouds), in *variegata* the moonshine is fairly regularly distributed around the margins of the pinnæ and pinnules, these being green in their central parts. As in the case of *lux-lunæ*, if the fern be grown in full sunlight the variegation quickly burns to brown and the plant looks shabby and miserable. If grown in deep shade, on the other hand, the "moonlight" does not develop and the plant only shows rather indistinctly two shades of green. If planted where direct sunlight does not reach it, however, but where there is plenty of light from an open sky, the colour-scheme is striking and handsome and the fern retains its beauty all through the season.

Probably on account of their fastidiousness in the matter of light and shade both *lux-lunæ* and *variegata* have been but little grown and are rarely to be seen in collections. I had myself given away or lost my original plant of *variegata* some years ago (during the war), but, in 1925, a self-sown seedling came up in my fernery, doubtless from a long dormant spore. This year it is a charming and beautiful plant, the colour being, I think, a little brighter than the original.

The polydactylous character is elegant and characteristic as in *polydactyla*, Dadds, which is well known, and which the late Colonel Jones considered to be the most beautiful of the fingered male ferns. Of course it is possible that Mr. Phillips may have found a *variegata* which may have been crossed with *polydactyla* and the original plant lost. The plant given to me was however supposed to be "a bit of the original."

F.W.S.

ALPINE FERNS.

Under the above heading are classed, *Allosorus*, most of the *Aspleniums*, *Blechnum*, *Cystopteris montana*, *Lastrea montana*, *P. lonchitis* and *Woodsia*. These ferns are at home in cloudland and are grown only with difficulty in flat low lying districts. They suffer by exposure to hot dry summer temperatures, and thrive only when under the influence of conditions prevailing at altitudes of 500 to 2,000 feet. The cultivator who is located at an altitude of less than 200 feet above sea-level, and at a considerable distance from the sea or other large body of water, will be well advised (if he values his peace of mind) to leave these Alpine ferns severely and smartly alone. Occasional successes may be scored by enthusiasts who are prepared to go to any lengths in order to satisfy the requirements of this class of fern, but generally speaking we lowlanders must yield the palm to our Scotch friends and others enjoying an altitude of 500 to 1,000 feet. *Blechnums* may be successfully grown in low lying districts provided the land is boggy, so that artificial watering is never necessary at any time of the year, but the writer suggests that in selecting a site for *Blechnum* culture, the cultivator must be not less than 800 feet above sea-level, in which case (given a north aspect and peaty soil) nature will do the rest, and in a very efficient and satisfactory manner.

In case the cultivator is compelled to operate at much lower levels, wet bog land is a *sine qua non*, with shade, shelter, a north aspect and other details in order to attain a reasonable measure of success. There is however a certain gloss on the foliage of *Blechnums* when grown under Alpine conditions (rendering them almost immune to discoloration by the vicissitudes of the weather) which is seldom if ever seen on plants grown at lower levels.

Asplenium marinum and *lanceolatum* are not alpine. These must have warmth, in fact a stove temperature suits the former quite well. The rest of the *Aspleniums* are either Alpine or sub-Alpine and prefer cool summer conditions. *C. fragilis* is less fastidious in its requirements than is *C. montana*, which is a true Alpine type, and cannot long exist above ground with the thermometer at summer heat.

Lastrea montana is one of the commonest ferns in the Lake District, where the summer temperature is cooler and more moisture-laden than in Cheshire and the Midlands. *P. lonchitis* is more Alpine in its requirements even than *L. montana*. The writer has seen only one permanently thriving *lonchitis* anywhere near sea-level, and that was grown under exceptionally favourable outdoor conditions in Carnarvonshire, and repeated attempts to establish it elsewhere in its immediate vicinity have all ended in failure. *Woodsias* are now almost extinct as wild plants in the British Isles; 2,000 feet is about the correct altitude for these ferns, and specimens brought down to much lower levels survive only a few years at most.

H. STANSFIELD.

[The *Blechnum* grows to a stature of two feet in the New Forest and in our Berkshire woods. *Lastrea montana* grows finer in Devonshire and Cornwall than we have seen it in the north. At Woody Bay (Devon) near the sea-level it rivals *Osmunda cinnamomea* in stoutness of stem and vigor of growth.—*Ed.*]

ASPLENIUM TRICHOMANES AND ITS VARIETIES.

This spleenwort is certainly one of the prettiest of our native ferns. When seen growing on a mossy wall its vivid green fronds with their shining black or dark brown stems are most striking, and invariably appeal even to the non-botanical observer who has an eye for the picturesque. Its habitat on walls and rocks, almost invariably on a limestone soil, indicates its requirements for cultivation, i.e., it must have a well drained and well aerated, but not dry, soil and a liberal allowance of chalk, limestone or old mortar. Although some of the older varieties have been lost to cultivation there are still many left and, as the plants do not occupy much space, a small house or frame will accommodate a very pleasing and interesting collection which can be examined at close range at any time of the year. Of the varieties, *incisum* is certainly the most beautiful, corresponding to *plumosum* in other species. It is also the oldest on record, having been noted and collected by Ray more than 200 years ago. Many sub-varieties of *incisum* have been found, and of these *Clementii*, one of the latest, is probably the best for, although less deeply cut than some of the other forms, it has a foliose and crispate character which is very telling. In order to see it at its best however it must be well and liberally cultivated, as otherwise it is often hardly distinguishable from other forms of *incisum*. *Clementii* was figured at p. 25, Vol. I, of *The Gazette* in 1910. The photograph shows the foliose and congested character very well, but does not adequately display the *incisum* form and cannot be said to do the variety full justice. Other specially good forms were *Claphamii*, *triangulare* and *laciniatum*, but it is doubtful whether any of them is now in cultivation. Any form of *incisum* however is beautiful and well worthy of being cultivated. All the above three forms were figured in Lowe's "Our Nature Ferns," published in 1869. The cut

of *Claphamii* is only a fragment, but shows the character well. The other two however are mere caricatures and must have been from very poor and ill-developed specimens.

After the *incisums*, *bipinnatum*, Ellis Roberts, is perhaps the most striking variety, being of large size with pinnæ like small fronds of the species. We well remember a frond being sent to the late Mr. Druery with the suggestion that it was a hybrid between *trichomanes* and *Athyrium filix-fœmina*. As the frond was fully 15 inches long and some six inches wide, its size gave some excuse for the idea, but there was otherwise nothing of the character of *filix-fœmina* about it. I have never since seen it grown to anything like these dimensions, although Mr. Henwood and the late Mr. Whitwell have both grown very well-developed and characteristic plants. The variety produces plenty of spores which give rise to more or less characteristic seedlings, but, unfortunately, a large proportion of these seem incapable of growing to the size of the original, and, consequently, instead of being bipinnate, are only imperfectly bipinnatifid. They all however have elongated pinnæ, generally more or less divided, and this gives distinct indications of their origin. The best forms, when well grown, are very striking. Another very fine variety is Mr. Cowan's Italian *foliosum*, which is a vigorous grower and very handsome when well developed. It is moderately deeply incised and abundantly fertile, so that it never takes on the really plumose character of the true *incisums*.

Confluens is a variety which has given rise to much controversy, the late Mr. Wollaston and Mr. Lowe both having believed it to be a hybrid with *A. marinum*, although Mr. Lowe limited this theory to the plant found by Mr. G. Stabler in Levens Park in 1870. When grown by Mr. J. M. Barnes this plant was very remarkable, having a much thicker

stem than any other form of *trichomanes*, and it was chiefly this peculiarity, combined with its apparently barren character, which gave rise to the theory of hybridity. The plant is still in cultivation, but rarely now produces the stout rachis of former times—indeed it is hardly distinguishable from the other plants of *confluens* which have been found by Messrs. Willison, Neill Fraser and J. J. Smithies, but the rachis in all these is somewhat stouter than that of other forms of *trichomanes*. The hybridity theory is now regarded with scepticism by most fern growers and botanists although the fact remains that no one has succeeded in raising it in quantity from spores: the present writer and Mr. H. Stansfield have each succeeded in obtaining a single plant from sowings of it. Our own seedling was very feeble and soon died. There is still hope however that seedlings may yet be raised as prothallia have several times been produced without getting beyond that stage. I have some now. Whatever may be its origin *confluens* is a very distinct and ornamental fern. The confluent tip of the frond, when well grown, rather suggests *Scolopendrium*, and a year or two ago Mr. Henwood had a plant which produced several entirely simple, strap-shaped fronds. *Confluens* is now the only imbricate variety (if we except *Clementii*), but there was formerly a very pretty dwarf one called *imbricatum*, which was found by Mr. Clapham in 1863. It has been apparently lost for many years, but may be found again. Of crested forms quite a number have been found at various times, viz., *cristatum*, *corymbiferum*, *ramosum*, *ramo-cristatum*, *dendroideum*, etc. One found in 1924 on Dartmoor by Mrs. Rowlands, wife of our member, Dr. S. P. Rowlands, is about the neatest in the lot; although closely resembling Wollaston's *cristatum* (see Druery's latest book on ferns, p. 264) it differs from it in the absence of any depauperation below the crest and in this is superior. It is still flourishing and has recently produced

seedlings true to type. Some of the other crested forms have been lost so far as is known at present, but *cristatum* and *ramo-cristatum* are still extant. *Trogyense* and *velum*, both found by the late Mr. E. J. Lowe, are handsome forms very much alike both having broad slightly incised fronds and triangular pinnæ and being abundantly fertile. They are dwarfer than Mr. Cowan's Italian form. *Mouleii*, found in Devon many years ago, is a pretty dentate variety and is still in cultivation. A very similar form was found more recently by Mr. Gott in Westmorland. *Serrato-constrictum*, Smithies, was found in Westmorland on one of the Society's earlier excursions and is a very distinct type. The pinnæ are narrow, acutely saw-toothed, and stand up almost parallel to the rachis giving the fronds a singular combed appearance. The variety comes freely from spores, but only a proportion of the offspring are equal to the parent. When first found a wall was seen almost covered with plants having this combed appearance, but in very varying degrees of excellence. All the members present secured plants, but Mr. Smithies was fortunate in picking out the best, and from this one seedlings have been raised.

F.W.S.

THE PRESIDENT'S LECTURE ON FERNS.

On April 5th Mr. W. B. Cranfield gave a lecture on British ferns and their varieties to the members of the Horticultural Club at the Trocadero Restaurant, London, Mr. Gerald Loder occupying the Chair. The lecture proper was preceded by the exhibition of a number of fronds from the lecturer's own garden, most of them having been grown and wintered in the open air. These, being shown at the deadest time of the year (for ferns), were intended partly to illustrate the evergreen character and garden usefulness, even in winter, of the ferns of the genera *Scolopendrium* and

Polystichum. The forms of *Scolopendrium* exhibited included *S. crispum speciosum*, *crispum nobile*, Bolton, *crispum fimbriatum muricatum*, *ramo-cristatum*, *grandiceps* and other well marked forms, while the *Polystichums* included forms of *divisilobum* such as *div. Bland*, *divis. falcatum*, *div. falcato-pinnulum*, and of *divisilobum plumosum* the forms *laxum*, *Grimmondiae*, *Baldwinii*, etc. *P. aculeatum* was represented by *pulcherrimum*, Bevis, *pulcherrimum*, Druery, various types of *gracillimum*, *pulcherrimum plumosum*, Green, *P. acul. densum*, etc. The lecture was accompanied and illustrated by a fine series of lantern slides, including some prepared by the late Mr. Druery, but the majority by Mr. Cranfield himself. Among the Druery series were slides showing the evolution of the *superbum* strain of *A. f.f. plumosum* from the normal through the Axminster variety and *dissectum* of Parsons to *plumosum cristatum superbum*, and, finally, to *plumosum*, Druery, the uncrested and culminating form. Mr. Cranfield's own slides included several of the *aculeatum gracillimums*, one of his own being particularly striking with its splendid pendulous habit and dilated extremities of the pinnules. Others which attracted particular attention were examples of photography in colours, such as *Polypodium dryopteris plumosum* (growing in a cave), *P. angulare divis. plumosum variegatum* (very striking) and *Scol. v. crispum speciosum* growing in quantity along the sides of a ditch in the lecturer's garden. After a short resumé of the geological history and general biology of ferns the lecturer descanted on their value as decorative objects in the garden, pointed out their very simple requirements—shade, moisture and shelter—and pleaded for their more general cultivation. A vote of thanks to the lecturer was proposed by Dr. Stansfield (who was present as an invited guest) and seconded by Mr. Tinley of the *Gardeners' Chronicle*. Mr. Tinley and other members referred in appreciative terms to a former visit to Mr.

Cranfield's garden by the Fellows of the R.H.S. It appeared that although the ferns had been seen and admired, there were other objects of interest as well as ferns, and even flowers, to be enjoyed. The vote of thanks was unanimously carried and a very pleasant evening was brought to a close.

AMATEUR FERN GROWING

(Continued).

(Reprinted from *Irish Gardening*).

wish them to grow more quickly. But there are things to be done. Every bit of withered foliage should be snipped off with a scissors as soon as seen, and deposited always *outside* the house. Do not try to pull it off. Some withered stalks are very tough, and the attempt may disturb the plant in the soil, or even partly root it up. Keep down growths of everything that is not a fern. When you plant the rock-work first it looks bare, and one thinks of furnishing it, by planting creeping or carpeting plants. The advice is, don't. The ferns themselves will soon grow up and do the furnishing. Two plants especially are liable to get in, or be deliberately introduced, and undoubtedly look pretty, but should be rigorously excluded. One is the small-leaved yellow-flowered sorrel: it is dainty and spreading and attractive, but it greatly encourages greenfly, a very troublesome enemy. Another, the larger-leaved white-flowered wood-sorrel, is also most attractive, but becomes intolerable, and then ineradicable: it creeps under ground, pushes into every cranny between stones, insinuates itself into the very crowns and rootstock of the ferns, and forms such a mass of luxuriant growth, that it smothers the smaller plants, and draws no little nourishment from all. Both these plants have exploding seed capsules, which scatter the seeds far and near, so that

when you attempt to clear them from a space, it soon appears green with innumerable seedlings. —

The common mossy *Selaginella* is another plant pest to be avoided. It grows rankly and smothers things in summer, spores itself freely, and so appears in most unexpected places. In winter it with difficulty survives. Masses of it die and get mouldy, starting decay all around and spreading it over the house : as it decays it is almost impossible to gather and throw it out, as at the slightest touch it breaks up and floats away to spread decay elsewhere. The only one we would admit is *Sibthorpia*, but even it runs and grows rankly in the moist warmth, so should not be planted near any small-growing forms, or it will smother them. It also seeds itself about freely. It is a most beautiful creeper, but should be strictly kept in bounds : this is very much easier than is the case of the other two, and it has no fault except that named.

Now concerning some animal pests. If our advice has been followed about the construction and preparation for the fernery, there will be surprisingly little trouble experienced with either slugs, snails or worms. This is a most comforting assurance. An odd slug or snail may have got in : if its traces are seen, either in an eaten plant or a slimy streak, seek assiduously for it, and if not found, set traps of orange-peel or potato slices, or damp bran with a drop of vinegar in it, and examine the traps both by night and day till it is caught, fearing not only the depredations it may cause, but the eggs it may lay, which would let loose a horde of spoilers on your preserves. Worms you need not trouble about, except that when you see one secure it and get it outside the house ; we will deal with them otherwise later on.

Woodlice (or "slaters") will certainly make their appearance, and increase to enormous numbers. Their natural food is really dead or decaying vegetable matter, but in your

anxiety to clear this all away, you leave the rapidly-increasing host too little food to subsist on, and so they will soon take to the green fronds, and cause alarming destruction. They creep up the mid-rib of a frond, attack the base of a leaflet, eating it through it soon falls to the ground, and they proceed to the next. Soon you will have the ragged mid-rib and secondary ribs standing gaunt and bare, and will find the ground below covered with curled up withered leaflets. We will also deal with these gentry later.

Greenfly are very likely to appear, especially on some ferns, such as Polypodies and Maidenhairs. They are not likely to be troublesome if other plants than ferns are excluded from the house. Fumigation will get rid of them easily; two, or at most three, fumigations in the season will suffice. Several excellent (!) materials for this purpose may be obtained from garden-supply firms, and the directions for their use followed—so no more need be said here.

Thrips is a bad pest, but should not appear. It affects mostly ferns with hard or firm texture of leaf, such as Harts-tongues, Cyrtomiums, &c. A grey appearance will be seen on the leaf in diffused patches; on turning it over there will be seen small black insects about $\frac{1}{16}$ th of an inch long, generally lying close to the veins of the leaflet, some immature forms may be seen, smaller and pale yellow, almost white in colour. These will appear and spread rapidly through the house, making every plant attacked look shabby and feel sickly, if the house is allowed to become too dry in summer. If, however, not only are the plants well watered, but the floor kept well watered, and so the whole air of the house thoroughly saturated with moisture, thrips is not likely to appear. If it does, fumigate twice in one week, and ply the water-can.

Scale (or bug) is another common scourge. It again tends to affect the same kinds of plants as thrips. To the inexperienced it may easily escape detection, being mistaken for natural scales on the plant. They are like limpets that we see on seashore rocks, but only about the size of a millet seed. They will be found stuck along the leafstem and back of the mid-rib and main veins. If a plant is found badly affected, the best treatment is to pull it up and put it in the fire. If lightly affected the only way of clearing it is to sponge and rub off the scales with water and soft soap. This is a most laborious process, and is likely not to be accomplished without considerable injury to the plant. So as we are out for pleasure, we will pull up and burn this lightly affected plant also.

Another enemy may be mentioned—namely, caterpillars. Either by night a moth may make its way in through the inch-open roof ventilator, or another ventilator if forgotten; or a butterfly may get in by day. It may then deposit eggs on a fern or ferns, and you know nothing about it till some day a fern is found terribly mutilated, and on examination a whole drove of caterpillars is found. There is nothing for it then but to pick them off and destroy them, watching for them day after day, for it is hardly likely that all will be found at the first search. To guard against this it might be well to cover the space of each ventilator with a sheet of perforated zinc. This has an additional advantage in that it breaks up the air coming in and prevents a draught, which is so hurtful to the plants in their growing stage.

The last enemy we will consider is reserved as the *bonne-bouche*. The Hun enemy of fern growers, whose method is frightfulness, whom we cannot beat alone, but will require faithful co-operation from allies, to even keep him in any sort of control. Sinn Fein is his watchword, and if you do not look out he will win and have the rockery to himself,

devastate your most treasured places, ruin your most cherished objects, and drive you, in despair, to leave him undisputed master. This is the character of the Fern Weevil. It is a small dirty-black or brownish beetle (or weevil), about $\frac{1}{4}$ -inch long, with faint greyish marking on the back, and the head prolonged into a pointed beak or snout (characteristic of weevils generally); its outer covering is very hard, so that if it falls, say on a stone or the cement floor, it bounds away like a marble. Its progression is slow. By day it lies hidden amongst the scales on the crown of the plant, or in loose earth near the plant, or small plants growing close to it, and is then almost impossible to find. By night it creeps up the frond and eats a semi-circular piece out of the edge of a leaflet. When, soon, a number of these pieces are cut out, the disfigurement is great, the whole appearance of a frond is destroyed. Added to this, the excrement voided scalds and discolours the leaf wherever it falls. It prefers to all others, fronds of good strong texture, such as Harts-tongues, Polypodies, Cyrtomiums, and suchlike; as a rule it avoids Maidenhairs, and will not touch filmy ferns—probably because it does not like wet and damp. If, hoping to catch the marauder, you go out at night with a light, you can see him busy at work if you approach cautiously, but on attempting to secure him, your breath even shaking the leaf, down he drops like a stone, and hops off any hard object he may strike, and so may come to rest a yard away from where you thought he fell. There he will lie absolutely motionless for about a quarter of an hour before he ventures to stir, and sneak off very quietly and slowly to shelter. Your night hunt will be successful if, having seen ten or a dozen, you secure one. Usually you will not have even one for your trouble. Sometimes an odd one comes out to feed by day or towards evening, and these you have more chance of securing: even then the chances are in his favour. But

worse is yet to come. The female deposits her eggs in the soil at the base of the crown, amongst the fern roots, grubs hatch out from these and proceed to live entirely on the fern roots, eating them away, up to the very rootstock ; as many as ten or a dozen may be found under one fern. Naturally the plant dies, unless it is a particularly large specimen and strong sturdy grower ; the result is that all our more delicate and small-growing forms soon succumb, and none are left to us but the commoner sturdy kinds, which can grow quicker than the weevils can eat. These grubs grow to about $\frac{1}{4}$ -inch long, rather fat and rounded, pure white, with little pale yellow heads, and are hardly seen to move. On one occasion we had a large *Polystichum* which formed a specially fine crown of folded fronds, giving great promise of a splendid plant next season. Being evergreen no fronds were removed. In the spring we watched for the unfolding and wondered that they were so late, other ferns had put up young fresh green all around, and the old fronds of this particular fern were gradually dying and looking the more shabby beside the others. We stooped to pull off a particularly faded frond, instead of cutting it, when, lo ! the whole big plant came up in our hand. There was not a root left remaining on it. We had before contemplated moving it to another more roomy position, but did not do so, as it would have necessitated taking down several rocks and a very large mass of soil, on account of its immense spread of roots. Yet now the weevil grubs had shorn it of every one. On searching through the soil underneath where it had stood we found about twenty grubs.

The adult weevils may be caught and destroyed if the ferns are in pots, by standing the pot in a bucket of water which covers the soil. Up comes the weevil in a few moments, climbing in, for him, a great hurry up a leaf stem or anything that is above water, then we can secure him with certainty

and stamp on him with grim satisfaction. But this method requires constant unremitting application. We could hardly plunge all the plants in a house on one day ; even if we did, some grubs might remain, which could not come up ; they would soon mature and continue their evil customs. If we decided to do six plants every day till the whole collection was gone over, we would find that of the six we did on Monday some were visited on Monday night by weevils from adjoining plants, who had wandered round for a change of diet, or who, having observed what you had been at during the day, considered that their locality was unhealthy, and had moved to the fresh fields you had left untenanted for them. Besides all this our fernery has no pots, and one cannot sink a whole rockery in a bucket of water, so friend weevil laughs, and fares sumptuously.

Again, a hunt for the grubs may be quite successful, but one cannot root up every plant now and then to look for them. The only satisfactory solution is not to introduce them. Get young plants, examine every plant carefully ; if semi-circular notches appear on the sides of the leaves of any, suspect the whole lot. Do not bring one into the house till you have first plunged every one to see if any adult weevils are present. Then, still working outside the house, turn every plant out of its pot, and even at the risk of the inevitable injury to the roots, pick out every bit of soil from the roots with a pointed stick, and even then wash them in a bucket of water. Plant the ferns at once. They will receive a severe check, and you may lose some, but these are very minor evils compared to that of introducing the weevil. Burn the soil that was shaken out of the roots.

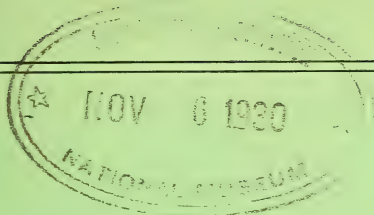
This is the last of the enemies we will discuss, and will turn to consider the friends.

Frogs are the first. They are indispensable. They do no harm of any kind. They will keep the woodlice in check, and also the worms ; that is their business ; they will keep at it day and night, and so beat you at it. Get a round dozen of them, and in the late spring add another dozen of small little fellows in their first spring of youth ; they will go for young woodlice and other small deer that would be beneath the notice of their more sober elders, besides they are more active, and it is surprising where they will climb. On fine days they may be found perched amongst plants on the highest part of the back wall. Their environment being so curtailed, and, possibly, their diet being so unvaried, they retain their diminutive size for several years, but are quite happy. If the drainage hole in the floor is not trapped as recommended, they will infallibly find the one way out, and rejoice and grow enormously fat in the free and varied living to be found in a town garden. Huge lob-worms, that one would not think there was room for, go down their throats with certainty, to be followed by as many more as present themselves, till froggie becomes so helplessly distended that he can scarcely move. It is good, therefore, to catch one in the greenhouse now and then, and let him out in the garden for fresh air, exercise and varied diet ; after a week or so, when you see one in the garden looking sleek and fat, he is again transferred to the greenhouse. In the spring they will revel in and spawn in a pan of water, if it is left for them, at other times they do not want it. Toads would serve an equal purpose, but we have not got them in Ireland. Lizards are an excellent help, but they are rare here and hard to get. They are very lively, attractive, and active hunters.

These, unless you have weevils, are all the pets you need accommodate in the fern house. If weevils are present the frogs will take toll of them, but will not be able to keep them

(To be continued).

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Polystichum angulare prothalliferum superbum,
H. Stansfield.

THE BRITISH FERN GAZETTE.

NEW SERIES.

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EDITORIAL NOTES.

The Editor congratulates the Society, firstly upon a sound financial position as shown by the Treasurer's Report in the present issue, and secondly upon what is even more important, viz., a substantial rise in the membership. This latter development is due to the activity of a number of members, but principally to the energy and social force of the President, from whom we enclose a recruiting proclamation. Several of the new members—notably Sir William Lawrence and Miss Willmott—have themselves taken part in the recruiting campaign, and so the snowball grows. A snowball, however, does not grow unless it is pushed and we hope that all members will join in the work of rolling it along and attracting still more members. We welcome all the new members and hope that fresh fields in gardening and botany may be opened to them.

Messrs. Perry, of Enfield, have sent us some fronds of ferns which are the result of a mixed sowing of *Polystichum aculeatum* and *P. munitum*. Although *P. aculeatum* appears

to be the dominant parent there is, we think, indubitable evidence of the influence of *munitum* and we believe the plants to be true hybrids. Along with them is a frond of *P. aculeatum* from Austria, which is thicker in texture and more coriaceous than the British type and the rachis is also much more furfuraceous. These characters, while not sufficient to constitute a specific difference, give the fern a distinct appearance and mark it as a different geographical type.

Mr. F. J. Hanbury, F.L.S.—who was invited to become an honorary member, but preferred to be an ordinary member—has kindly invited the members “individually or collectively” to visit his charming garden at Brockhurst, East Grinstead. We propose to get up a party for a visit in the spring or early summer and anticipate a great treat on the occasion. Will members who would like to join please communicate with the Hon. Secretary.

The comprehensive article on “Amateur Fern Growing” by Dr. H. C. Drury, is concluded in the present number. It contains much that will be useful, not only to the beginner, but also to the experienced grower. We regret having had to serve it up in so many fragments. Readers who would like to have it “all in one piece” can probably obtain the number of *Irish Gardening*, January-April, 1919, in which it originally appeared.

We have received from Mr. W. H. Coverdale, of Ripon, two fronds and a photograph of a crispate form of *Osmunda regalis* under the name of *O.r. crispa*, Coverdale. Mr. Coverdale acquired the plant about 1888, but it was supposed to have been found, some years before, by a man named Dowson in company with another, on the moors near Kirkby Moorside, Yorks. It is quite a fine form, but, so far as we can judge from the dried pinnae and photographs, does not appear to be

distinguishable from *O.r. undulata* found by the late George Brown in the island of St. Michael's, Azores, and sent by him about 1875 to Messrs. Stansfield, of Todmorden, and by them distributed. Of course, Mr. Coverdale's plant may have been an independent wild find and, as such, would be interesting as "truly British," but as the supposed finders have both been dead for some years it is now probably impossible to obtain satisfactory evidence of this. Messrs. Perry, of Enfield, have a stock of *undulata*, Brown, for sale, and we are indebted to them for a plant. Mr. H. Stansfield also has plants.

The Hon. Treasurer, Mr. J. J. Sheldon, will be glad to receive payment of all due subscriptions for the current year.

OUR FRONTISPIECE.

Polystichum angulare prothalliferum superbum, H. Stansfield.

The illustration is from a photograph of a plant grown by Mr. T. E. Henwood of a fern raised by Mr. H. Stansfield. Its parentage is the Jones-Fox strain of *plumose divisilobes* and no doubt the fern, when it puts on its adult plumage, will be a typical *plumose divisilobe*. The "prothalliferum" is a temporary character as it was in the prototype *plumosissimum* of Birkenhead and in the *pellucidums* previously raised by Mr. H. Stansfield. Nevertheless, as the photograph testifies, the phase is exceedingly beautiful and is also of great biological interest. The little tails of semi-pellucid tissue in which the ultimate divisions terminate are not yet prothallia in the full sense of the word, but they are readily capable of becoming prothallia in an atmosphere saturated with moisture. If pinned down on the soil they will develop root-hairs, archegonia and antheridia and become real prothallia, giving rise to new plants. If they would do this while still attached to the parent frond (which probably

they would under favourable circumstances) they might be considered as functionally flowers and as bridging the gap between cryptogams and phanerogams. The fern is certainly lovely in its kitten stage, but it must be remembered that kittens will grow into cats, thereby losing some of their attractiveness. Messrs. Birkenhead killed their original *plumosissimum* in trying to keep it a kitten by growing it constantly in a warm, moist atmosphere, but fresh kittens were raised and *plumosissimum* still exists, though it is many years since we saw it in the kitten stage. No doubt fresh relays of *prothalliferum* can be produced by raising plants from the aposporous tips, but these, in turn, must be allowed to develop into the adult form or they will soon lose their vigour and die. Youth is a precious thing, but fugitive in ferns as in human life—only more so.

THE ANNUAL MEETING.

The Thirty-second Annual Meeting of the Society was held on Monday, September 5th, 1927, at the Peerless Hotel, Tenby, Pembrokeshire, the President, Mr. W. B. Cranfield, occupying the Chair. There were present members from Enfield, Welwyn, Great Bookham, Warlingham, Canterbury and Reading. The minutes of the previous meeting were read, confirmed, and signed. It was resolved that the President, Mr. Henwood and Dr. Stansfield be a Sub-Committee to negotiate with persons of eminence in the fern world with a view to the election of honorary members of the Society. It was also resolved that the degrees and titles (if any) of all members be published in the general list.

The Hon. Secretary reported that the number of members of the Society was now 73, six having resigned during the year and one, Mr. F. Silva, of Lyme Regis, having died. Two members were elected at the last Annual Meeting and

five had joined since. Sir Archibald Buchan-Hepburn and Canon Hawkins, of Stroud, had each made special contributions to the funds of the Society, of two guineas, making up, with the donations of members present at the last Meeting, the sum of £43 1s. 0d.—slightly more than the deficiency in the funds of the Society.

The Hon. Treasurer, Mr. J. J. Sheldon, presented his report as below :—

BALANCE SHEET.

INCOME.	£	s.	d.	EXPENDITURE.	£	s.	d.
Balance from 1926 ..	22	8	8	Affiliation Fee to			
Subscriptions and				R.H.S.	2	2	0
Donations ..	36	14	0	" Gazette," Dec., 1926	12	17	0
Sale of " Gazette " ..		5	0	„ June, 1927	10	10	0
Advertisement ..	2	2	0	Hire of Committee			
Plate for December				Room		5	0
" Gazette " (given				Purchase of 2 Vols. of			
by Mr. T. B. Blow)	1	12	6	" Gazette " ..		10	0
				Stationery & Postages	2	10	7
				Balance at Bank ..	34	7	7
	£63	2	2		£63	2	2

Balance at Bank, £34 7s. 7d.

Audited and found correct, September 5th, 1927.

(Signed) PERCY GREENFIELD, Auditor.

It was resolved that the Hon. Secretary's and Hon. Treasurer's Reports be received and adopted.

The Officers and Committee for the ensuing year were elected as per the following list :—

President :

Mr. W. B. Cranfield.

Vice-Presidents :

Mr. Alex. Cowan,

Mr. T. E. Henwood,

Rev. Canon Hawkins,

Rev. Canon Kingsmill Moore,

Mr. J. J. Smithies,

Mr. G. E. Stephens.

Hon. Treasurer :

Mr. J. J. Sheldon.

Hon. Secretary and Editor of Gazette :

Dr. F. W. Stansfield.

Hon. Auditor :

Mr. P. Greenfield.

Committee :

Mr. T. B. Blow, Welwyn,	Dr. T. Stansfield, Reading,
Mr. T. Brown, Belfast,	Mr. F. W. Thorrington,
Mr. P. Greenfield, Warlingham,	Little Baddow,
Dr. S. P. Rowlands, Doncaster,	Mr. R. Whiteside, Lancaster.

The following new members were elected :—

Mr. Mark Fenwick, J.P., Stow-on-the-Wold.

Mr. A. J. MacSelf, Reading, Editor of *Amateur Gardening*.

Mr. J. J. Parkinson, Enfield Chase.

Mr. W. B. Walker, Enfield.

It was resolved that the President, Hon. Secretary and Mr. Henwood be a Sub-Committee to decide upon the place of meeting for next year.

Mr. T. B. Blow exhibited fronds of *Blechnum spicant ramo-cristatum*, Blow (wild find in 1926) and was awarded the Society's Certificate for the same.

The President exhibited a large series of fronds grown by himself, all in very fine condition and character, and was awarded Certificates for the following :—

- (i) *Scolopendrium v. crispum splendens*, Moly, a magnificent broad form found wild by the late Mr. Moly. This form is very similar to *crispum grande*, Wills, but is, if possible, a little wider and more curly.
- (ii) *Polystichum aculeatum pulcherrimum*, Cranfield, a seedling on the lines of *pulcherrimum*, Druery, but having longer and more drooping pinnules.

- (iii) *P. aculeatum divisilobum*, Cranfield, wild find at Chardstock in 1921 ; a large growing form, not to be compared with the best *divisilobes* in *angulare*, but the only one, so far, in *aculeatum* and perhaps the parent of a new race.
- (iv) *P. angulare foliosum*, Moly, wild find by Mr. Moly.
- (v) *P. ang. multilobum rotundatum*, Benbow, a seedling by Mr. Cranfield from a wild find of the late Mr. Benbow. A very distinct thing.
- (vi) *P. ang. percristatum grande*, Cranfield : a seedling from Canon Hawkins's wild find *cristatum* No. 1. A *percristatum* with large heads.

Mr. T. E. Henwood was awarded Certificates for :—

- (i) *Polypodium vulgare plumosum*, Whilharris, received from the late Mr. Whitwell and, by him, from Glasnevin Botanic Gardens. History unknown. Perhaps the finest, so far, in the *Cambricum* section. It was effectively figured in *The Gazette*, Vol. V., No. 5.
- (ii) *Polystichum aculeatum cristatum*, Henwood, wild find near Axminster in 1924. Very distinct and good.

Mr. Sheldon was awarded a Certificate for :—

Scolopendrium v. crispum cristatum, John Cousins, wild find.

Dr. Stansfield was awarded Certificates for :—

- (i) *P. angulare pulcherrimum*, Moly's green (corrected plant). This is a bud or crown sport from Moly's original find, which latter produces a proportion of normal fronds and pinnae, while the "corrected" plant is true throughout.
- (ii) *P. angulare acutilobum*, Stansfield, wild find at Howley, Devon, in 1914. Frond exhibited and grown by Mr. T. E. Henwood.

The party remained at Tenby, in diminishing numbers, for about ten days, during which the surrounding neighbourhood was fairly well explored for ferns. The County of Pembroke is divided into two parts by a line running almost directly west from Tenby and corresponding roughly to the "Ridgeway," the main road to Pembroke and Milford Haven. South of this line the geological formation is mainly limestone, while on the north it is largely coal measures and millstone grit. Our explorations were mostly on the limestone, experience having shown this to be usually more fertile in varieties than the other formations. On the limestone the species found were *Scolopendrium vulgare*, *Polystichum angulare* and *P. aculeatum* (the latter only very sparingly), *Polypodium vulgare*, *Asplenium ruta-muraria* (plentiful), *A. Adiantum-nigrum*, *A. trichomanes* and *Ceterach*, *Lastrea filix-mas* and *L. paleacea*, while the marshes contained *Lastrea thelypteris* and *Asplenium marinum* was found on the rocks by the sea. On the non-calcareous formations were found also a sprinkling of the same species, spores having been carried across the dividing line by the prevailing winds. Other species, not found on the lime, were *Blechnum spicant*, *Athyrium filix-foemina*, *Lastrea dilatata* and *L. montana* with *L. filix-mas* and *L. paleacea* all very flourishing. *Pteris aquilina* was, of course, found on both sides of the line, but *Osmunda*, which was formerly not uncommon in the district, was not found except occasionally in cottage gardens in which it had survived for a time after removal. Another fern expected, but not found, was *Asplenium lanceolatum*. *Lastrea æmula* was not seen, although known to exist in at least one station in the county. Of varieties a number of crested Hart's tongues were found, Mr. Cranfield securing the best although he had only one day's hunting, and Mr. Sheldon having another. Several multifid forms of *Asplenium trichomanes* were also found. Mr. Sheldon and Mr. Greenfield

found several *P. vulgare semilacerums*, while Mr. Greenfield, hunting with Mr. Henwood, found and shared with him a pretty crispate form of *P. angulare* in the way of Colonel Jones's Hale *crispatum*. Mr. Henwood also found a couple of possible *angulare brachiatums*, both small plants requiring, and deserving, to be tried under cultivation. Mr. Sheldon found several promising *angulare tripinnatums* and Dr. Stansfield found a good *angulare acutilobum* and a *tripinnatum* resembling Padley's. All the above were found on the limestone, while the coal measures, although ferns were exceedingly fine and abundant, yielded no varieties. No one however, went home quite empty-handed. The total number of ferns, collected by the whole party, could probably have been packed into one moderately sized vasculum, so the flora of the County was not seriously impoverished.

A NEW HARDY ADIANTUM.

Messrs. Perry, of Enfield, have sent out a new hardy *Adiantum*, which they have received from America and which was supposed to be of hybrid origin—possibly a cross between *A. pedatum* and *A. Capillus-Veneris*, and consequently a sort of British-American hybrid. A frond from a plant in the possession of Mr. T. E. Henwood has been submitted to our Hon. Member, Mr. C. H. Wright, A.L.S., the fern expert of the Kew herbarium, and has, by him, been identified as *A. flabellulatum*, Linnæus, a species new to cultivation in this country. This fern is not to be confused with *A. flabellulatum*, Wallich, which has been in cultivation for many years and is mentioned in Lowe's "Ferns, British and Exotic." We have paid a visit to the herbarium of the Linnaean Society in order to compare Messrs. Perry's fern with the original Linnaean specimen of *A. flabellulatum*. We found

that while the two correspond in outline of frond and shape of pinnules, the Linnaean plant has a hispid or glandular pubescence upon the stalklets of the pinnules, while Messrs. Perry's fern is smooth throughout with the exception of a few linear scales near the base of the stipes. Mr. Wright reports that the Kew specimens also have this character, but that it varies in amount, not only upon different fronds, but upon different parts of the same frond. It is quite likely, therefore, that there may be entirely glabrous forms like the Perry plant. The Linnaean plant is found from the Himalayas to the Malay Islands and so, as Mr. Wright says, "may well be hardy in a cold house in this country." The new fern is similar in habit to *A. pedatum*, but the rhizome is less wide-creeping and it has the advantage over *pedatum* of being thoroughly evergreen. It will be a useful addition to our not too long list of hardy *Adiantums*. It still remains to be tested in the open air, but there seems no reason why it should not succeed in sheltered positions.

F.W.S.

FERN HUNTING IN TEESDALE.

Upper Teesdale has justly been called the Botanist's Paradise, for within a very few square miles there are to be found a number of rare and interesting plants such as can hardly be equalled in any other area of the same size in the whole country. Some of them, in fact, are found nowhere else in the British Isles. There, in early summer, the meadows are gay with Trollius and Mountain Pansy, while many a stream-side is lit by the dazzling blue of *Gentiana verna*, or the soft purple haze of myriads of *Primula farinosa*. Later, these same streams are adorned with the rich orange of *Saxifraga aizoides*, interspersed with *Pinguicula*, *Sedum*

villosum and the dainty Grass of Parnassus. The area in question, having as a convenient centre the Langdon Beck Hotel, lies on either side of the river Tees, a few miles below its source on Cross Fell. It is at the meeting of three counties—Yorkshire, Westmoreland and Durham, and in a short walk one can put foot in all three. Middleton-in-Teesdale, on a branch line from Barnard Castle, is the nearest railway station and is seven miles from the Langdon Beck Hotel.

Geologically, the area is of considerable interest, consisting of limestone, with a great intruded mass of volcanic material known as the "Whin Sill." This is exposed in many places along the river in the form of huge basaltic boulders, in places forming high cliffs, as at Cronkley Scar and the Falcoln Clints. Where, in bygone ages, the molten lava came in contact with the limestone, this latter became altered and crystallised into a form known as "sugar limestone." In places this is exposed, and on its soft-weathering, granular surface are found such rarities as *Dryas octopetala* and *Viola arenaria*.

Owing to the abundance of the volcanic rocks, coupled with the fact that vast areas are covered with moorland bogs, lime-loving ferns are not as abundant as one might expect. Only one small Hart's tongue was seen, during the ascent of Mickel Fell, Yorkshire's highest mountain, but I understand there is another plant in the district! *Polystichum aculeatum* is sparingly distributed in suitable places and we found one plant approaching *angulare*. *Ceterach* was not seen. *Asplenium Ruta-muraria* was occasionally met with on the few old walls that were mortared, while *A. Trichomanes* was met with mainly along the river, growing luxuriantly where it did occur. *Asplenium viride* was far more abundant, especially near the waterfalls and in rocky hollows near the mountain tops. All three forms of the Male Fern were

seen in abundance*, and *Lastrea montana* less plentifully. Above the waterfall of High Force, the Teesdale area is almost treeless except for a few small fir plantations, but towards Middleton are some fine woods, in which *Lastrea dilatata* is by far the commonest fern. The Lady Fern apparently preferred more open and even exposed situations. *Cystopteris fragilis*, with its variety *dentata*, was very plentiful on old walls and under boulders everywhere ; so was *Blechnum spicant*, especially on the wet moorlands and moist hillsides. In spite of this, our usual annual "percristatum" failed to turn up ! Splendid clumps of the elegant Parsley Fern were frequently to be seen in rocky places, while the Oak and Beech Ferns were met with daily.

Our main hunting, however, concerned three rare species — *Woodsia ilvensis*, *Cystopteris regia (alpina)* and *Polystichum lonchitis*. All these three have been found on those imposing basaltic cliffs called Falcoln Clints, on the Durham side of the river. The Tees, having pursued a sluggish course for some miles, suddenly comes tumbling down a basaltic staircase at Cauldron Snout, passes in a curve round the foot of Falcoln Clints, winds round Cronkley Sear, falls down the wonderful waterfall of High Force and then continues between wooded banks down to Middleton and Barnard Castle.

Falcoln Clints forms a wonderful hunting ground and it was here, many years ago, that that wonderful man, James Backhouse, found both *Woodsia* and the Alpine Bladder Fern. The *Woodsia*, however, has not been seen in recent years, and in Mr. Druce's opinion, it is probably extinct.

* Under *Lastrea propinqua* I include what I presume is called by Lowe *var. abbreviata*, which is characterised by a dwarf stature, crispy pinnules and a marked tendency to the formation of a number of small crowns on each plant. In "Our Native Ferns" (Vol. I., p. 237) Lowe puts this under *pseudo-mas*, but in his little book in the Young Collectors' Series, it is transferred to *propinqua*. This form is abundant on the rocky gorges above the High Force Waterfall.

Probably the same can be said about *Cystopteris regia*. We spent two whole days exploring a mile or two of cliffs, peeping into every accessible crevice and looking under as many as we could of the thousands of boulders that lie about their feet. We examined some hundreds of plants of *Cystopteris*, of all sizes, but failed to find anything approaching what we conceived *Cystopteris regia* should be like. This is rather a mysterious fern, practically unknown to the average botanist and not easy to obtain for cultivation. *Polystichum Lonchitis* is, of course, a much less rare fern, and it should have turned up somewhere on Falcoln Clints, but we had to register another failure in this case. The neighbouring plateau of Cronkley Fell was more hopeful ground, but owing to unfortunate weather and the counter-attractions of the floral treasures of that area, we perhaps did not search as thoroughly as we should and were duly rewarded by not finding it. A small sporeling with fronds an inch long, which might be a young Holly Fern, was found on the eastern end of Cronkley, and we succumbed to the temptation of taking it home to see how it would turn out. Thanks to information given by a friendly farmer, however, we were able on our last day to see a dozen good plants on a neighbouring mountain on the Westmoreland side and managed to get a good photograph of one of them. No varieties of any importance were found, but we were well repaid for our strenuous exertions by seeing many of the less common species growing under ideal conditions. Upper Teesdale can be recommended to the fern lover in search of an ideal holiday.

S. P. ROWLANDS.

THE PHYSICIAN, THE GARDENER, AND THE FARMER.

It has often occurred to the writer that there is a striking parallelism between the work of the gardener and that of the physician. It is not without significance that so many

eminent gardeners and botanists have been medical men : for instance, among the last five directors of Kew Gardens, there have been three medicos, Sir Wm. J. Hooker, Sir J. D. Hooker and Sir David Prain, while other names that immediately occur to one are the late Sir Trevor Lawrence and Dr. Maxwell T. Masters of the *Gardeners' Chronicle*. The great Linnaeus himself and the celebrated Boerhaave were also shining, if less recent, examples of dual eminence. Among British fern specialists we may recall the names of Clowes of Windermere (finder of *Lastrea remota*), Allchin, Lyell, Wills and Fox, while among present members of our Society are two or three medical men who are not infrequent contributors to *The Gazette*. The gardener is, in fact, both doctor and nurse to his vegetable patients and the qualities required for a successful gardener are the same as those needed by a physician, viz., patient observation, unremitting diligence and, most of all, a love for the patients themselves and a desire to see them well and flourishing. While it is probable that many eminent gardeners have been helped by their knowledge of medicine the present writer at least has been helped in his medical work by his knowledge of gardening. The real amateur gardener (we use the term in its literal sense, not as excluding professionals, but as meaning all those who are gardeners because they like it) hates to see a plant doing badly and feels humiliated and sad if one of his patients dies. He gives his best attention and the choicest positions, not necessarily to the most valuable plants, but to those which seem most to need it. He looks upon his plants as individuals and cares for each of them as a friend. When a plant is doing badly he, first of all, tries to discover why it is so, and, having done this, immediately proceeds to remove the cause of the trouble and to provide better conditions. Above all, he must have patience. A dying plant cannot be revived by strong stimulants such as manures

and "bottom heat," but must be placed in the conditions necessary to preserve what vitality is left and must be nursed back to health by plain and wholesome fare and prompt and regular attention to its immediate needs. Nature will then proceed to repair the damage if there be sufficient vital energy left to do so. As the old surgeon said, "I dressed his wound and God healed him." In the spring of the present year we received from a friend a crown of a valuable fern without either roots or fronds. Being a *Polystichum* it was potted in pure fibrous loam, placed on the floor of a cool house and watered very sparingly. New fronds soon began to develop and these were carefully sheltered from drought, winds and sun, any of which would have quickly destroyed them and, with them, the life of the plant. When the fronds, already formed in the crown, had expanded, growth came to a stop, but roots were beginning to form and were soon sufficient to support the fronds. By the autumn the plant was furnished with both roots and fronds, and a new crown was in process of being built up for next year. Next spring it will be planted in the open ground and should go on from then without a check. Perhaps the most difficult fern to deal with is one having an exhausted crown or which has become "blind." Should there be living fronds, whether few or many, these must be sedulously preserved and protected by a bell-glass or otherwise until a new crown can be built up. Even should there be no roots these will form if the fronds can be kept alive. Should there be roots but no fronds sometimes a new bud will form either in the centre or at the side of the old crown and a fresh start will be made on a small scale. Should the exhausted crown have neither roots nor fronds its case is parlous indeed, although even then it is not quite hopeless. The only treatment is to cut away all dead and moribund material and get down to living tissue. The remnant of life is then dropped into a wide-mouthed

bottle or jar, containing wet silver sand, which is then tightly corked up and put in a shady place, but preferably in a little gentle warmth. In many cases tiny buds will form upon the surface of the pieces of caudex, and in time these will grow into small crowns and eventually into plants. Mr. Cranfield has described this method of treatment of almost dead plants in "The Narrative of a Resuscitated Collection" (*Gazette*, Vol. I., p. 251), which is well worthy of being re-read by all and sundry. Before matters have reached this extremity, however, there are many cases where special treatment is required. Should the plant be infested with vermin of any kind these must be destroyed as a primary measure. Again it may be trying to live upon unsuitable food, e.g., the soil may be sour, exhausted or too rich, or may be lacking in some necessary substance such as lime, potash or humus: the drainage may be defective or the surface may be covered with liver-wort which deprives it of air. In short, in vegetable, as in human pathology the first thing is to find the cause of the trouble: the second, to remove it. The effect will then cease automatically. A great many human diseases can be traced to something wrong in the patient's habits or mode of life—these being corrected Nature at once reverts to the proper groove and restoration to health begins.

The position of the farmer is somewhat different from that of the gardener proper, whom I call the amateur. He cannot afford to give special attention to each cabbage or turnip or wheat plant, but looks at his crops from the broad and general point of view. He must look for wholesale results and it pays him better to burn or plough in a poor crop and make a fresh beginning rather than to try to nurse up and cure one which is perhaps badly infested with blight. The gardener who looks at his work from a purely commercial point of view—whose one object is to make money—has.

of course, more of the spirit of the farmer than of the physician : he cannot afford to waste time upon the sick and dying, but must cater rather for the flourishing and for those which can be made to flourish with the least expenditure of energy and capital. Nevertheless, both the commercial gardener and the farmer must have something of the spirit of the physician even if it be rather that of the medical officer of health than that of the private practitioner. He must provide the conditions which are essential to health in the mass, and must leave to others the duty of trying to snatch individuals from destruction. Indeed, he often finds it necessary to "dispatch" a batch of sickly plants in order to prevent the spread of infection. This slaughter of the innocents is rarely necessary among ferns, however, as they can generally be freed from animal and vegetable pests by appropriate treatment. This is, however, where the private practitioner or amateur gardener comes into play, but even the farmer may sometimes find it necessary to practise individual medicine.

F.W.S.

FERNS AS PET PLANTS.

(Read at the Meeting of the British Pteridological Society, at Bowness, Windermere, August 1st, 1898.)

It is not often that we see ferns under culture in amateur hands, or for the matter of that even in the hands of professional horticulturists, brought to absolute perfection of development, that is, grown in such a fashion that both as regards size and healthy growth, the full ornamental capacity of the plant is brought out. We see, for instance, on the one hand, huge plants growing under particularly favourable conditions of soil and general environment, but just because they grow so freely as to demand no care to keep them in existence, they receive no care to keep them in form, and

hence despite their size are imperfect specimens. On the other hand, we find small examples, healthy and pretty, but cramped by inadequate pot room or other checks upon free growth, and hence only capable of displaying their characteristics on a limited scale. In going the round of our fern collections we find these two conditions of affairs almost invariably represented, but every now and again we come across specimens of ferns which by a happy combination of circumstances have attained their best, and in such cases become revelations even to connoisseurs, so immense is the difference between such fully developed plants and their stunted or roughly grown examples elsewhere. In nature we, in our fern-hunting expeditions, find precisely the same thing, the immense majority are more or less handicapped by unfavourable conditions owing to their spores having fallen where existence is certainly possible, but where development is bound to be checked at an early stage. A dry stone dyke has its chinks full of seedlings all fighting for life with each other, and liable in a very dry spell to be annihilated *en masse*, but jumping the dyke and plunging into the wood beyond, we find decent isolated specimens, bitten however by rabbits or fretted by the winds, while under the ground the greedy tree roots all but monopolize the soil, and so the ferns are checked both above and below. Now, however, we come to a deep rocky glen, its steep sides masses of rocky debris and thick deposits of loose leaf mould, the shifting character of which is unfavourable to spore development, and hence constitutes a check in numbers. Doubtless, too, the winter spates in such a glen ruthlessly carry away most of such youngsters as manage to obtain a temporary foothold, sparing only such as are firmly anchored. Around, the blazing sunshine filters through a leafy but not too dense a screen, and even in a tempest the howling winds are excluded, while, to crown all, the splashing torrent amid the rocks affords a

necessary supply of humidity to both soil and atmosphere. In such a position it is that we find *Athyrium*, *Polystichum*, *Lastrea*, *Hartstongue*, and *Blechnum* display their full stature and beauty. Oak fern and Beech fern carpet the slopes, and their hardy cousin, *Polypodium vulgare*, revels on the old tree stumps and rocky debris around them. Returning now to the dusty roadside, with its diminutive plants of the selfsame species, it is difficult to imagine that each of these has within it, given the like conditions, the same capacity of loveliness as the large, finely cut, foliaceous, and extremely handsome denizens of the glen. This fact, however, grasped, and it is a fact, it often becomes positively painful to the fern lover to regard the handicapping which generally takes place under the name of cultivation, and to view its unhappy results. Undoubtedly one of the chief axioms of proper culture, taught by the glen, is ample room and facility for each crown to develop. A bunch of fronds is never so pretty as a single crown, and in the glen we shall notice that wherever a single-crown plant has come to the fore, that plant is the most striking and the handsomest. What can beat a grand shuttlecock of *L. pseudo-mas*, golden green and perfect? *L. montana*, with its foot in the water, occasionally manages to play the same single role, and only then shows itself at its best, while the Lady fern spreads her feathery pinions ever the widest and dons her most delicate laces under like conditions.

Space, however, is to the average fern lover a very limited factor, and hence the owner of a collection, unless he be unusually favoured by fortune, is bound sooner or later to find himself confronted by the necessity of choosing between limiting his pets in number or in individual size, and this especially if climatal conditions compel him to grow under glass. Glass indeed, whether in the form of frame or green-

house, is in many places indispensable for the production of the aerial conditions of the ferny glen ; and when we find that one single-crown specimen of the Lady fern, such as one in my collection, requires a circle of nearly 8 feet diameter to accommodate its pendulous, crested fronds, it is clear a big collection numerically of varieties on this scale requires a big purse to suit, though very much of course can be done by judicious adjustment and the elevation of such large specimens above the smaller members. The point, however, I am aiming at is rather the fuller and more perfect individual development of some of the smaller growing species, so that all the beauty they are capable of shewing shall be fully brought out. Beauty in a fern is exemplified in two ways, viz., habit of growth and detail of characteristic form. Both these must be equally studied and permitted to display itself, and this cannot be done on the bunch system, which reduces all to a uniform level of bushy growth in which the grace of pendulous habit or like peculiarity is largely obscured or lost altogether. Adequate root space must also be given, and the particular taste as regards soil of each species must be studied ; and, finally, the distribution of light, *i.e.*, aspect, must be adjusted, so that symmetrical and not one-sided plants are, if possible, arrived at. In indoor culture, one of the commonest forms of cruelty to plants is twisting and turning them about to face the room, and as all the care in the world will never educate a fern to grow otherwise than towards the light, the plants so treated are distorted and drawn out of all natural form. For window plants, therefore, a shady window being selected, the same side of the pot *must* always be towards the light, and only a one-sided plant can possibly be grown. This, however, by no means necessarily implies detracting from its beauty. In the typical glen referred to, we see many of the finest specimens springing from the steep sides and lighted only from the front, and we have a very

vivid recollection of a Hartstongue in a London suburban window, and evidently grown by a true fern lover, which had formed the grandest possible circlet of fronds fully a yard over by recognition of this very simple rule of fixed position. The Hartstongue, by the way, is very rarely seen in its best form. It is true it is not so definitely central in its method of growth as the shuttlecock *Lastreas*, but it is usually easy to single out a strong centre and remove offsets as formed so as to foster development of the main plant by at once removing competitive growths, and affording it the more space for its frondage. The result is invariably striking : the fronds become not only larger and more robust, but the varietal characters are strongly accentuated and enhanced, so that we eventually arrive at the ideal plant of the glen, in lieu of the ordinary stunted form. In time, too, ferns thus treated become less and less liable to split up their crowns, such splitting up and multiplication by offsets being usually the results of checks upon proper frond development, though in some cases it is a varietal character, and, of course, in that case the caespitose nature of the variety must be respected and yielded to. Obviously, for instance, no man can make a single-crown specimen of Kelway's *Scolopendrium densum*, which builds itself up by crowds of bulbils ; the *Polypodies* and *Bladder* ferns are also clearly not amenable to crown treatment at all ; our remarks therefore must be naturally applied only to caudex-forming species and varieties, and as a general rule it may be accepted that all large-fronded varieties are best when so treated, and that the incorrigible bunch ferns are of dwarf habit, the vigour of the plant finding its outlet in these by lateral multiplication precisely as it does in others when their frond growth is checked by adverse conditions.

Another advantage of single-crown cultivation is that once the caudex is well established and the tendency to produce

offsets is eliminated, such a plant with adequate pot room will grow to perfection for many years without shifting, an occasional mulching on the surface sufficing for all its needs. With the bunch system, however, the pot gets filled with crowns all struggling with each other for room to live in and dwarfing each other as a sort of compromise. In time the whole clump becomes impoverished and unsightly, and if shifted into larger pots simply spreads still more on similar lines until the only result is a bigger bunch just as replete with natural grace and beauty as a bunch of greens in a green-grocer's shop. One of my finest *Athyria* has been in splendid form in a shallow cork receptacle wired on to a roofing slate for at least fifteen years, sending up annually at least a score of yardlong fronds, with quite unabated vigour. There is a material point in a pet plant, as one's attention is more concentrated and there is consequently a fuller appreciation of the beauty as well as an immense enhancement of it by the concentration of all the root energy upon a single axis of growth.

In short, to all those who make pets of their ferns, and that, I take it, is the case with all the members of our Society or they would not join it, I strongly recommend culture on the single-crown system whenever possible, not simply dumping their specimens into the soil and letting them spread at will, but starting with a strong centre, to keep it isolated, repressing side growths persistently, until in due time they are rewarded with the results I have indicated, and which experience has shewn me to be well worth trying for.

CHAS. T. DRUERY, F.L.S., V.M.H.

AMATEUR FERN GROWING

(Continued).

(Reprinted from *Irish Gardening*.)

down. We must again invoke Dame Nature to fight Nature. Search the garden, through every bit of rubbish, under stones, fallen leaves, &c., for the large red centipedes—big fellows about $1\frac{1}{2}$ inches long.

Gently secure—they are very easily injured—every one found and transfer it to the greenhouse. Hunt frequently for them, and get all that you can. These are carnivorous beasts; they live on eggs, larvæ, and small insects. They burrow through loose earth and under plants and leaves, and if they come across the eggs or grub of the weevil, will doubtless make a hearty meal off them. And, again, like the frogs, that is their business, and they will keep always at it, and the constant hunt tells in the end. It is, unfortunately, true that our favourite frogs refuse to discriminate between them and lawful game, so swallow them with as much gusto as they would a “slater.” So it is up to us to keep up the supply and hope for their agility and secretive habits to escape the frog danger till they have done some good work amongst the weevil grubs.

The season after we thought of this plan of fighting the weevil there was no appreciable change in the devastation it caused. The second season we felt sure there was less damage done. The third season we were really surprised to find how little injury there was compared with even the previous year. The fourth season it was with difficulty any trace of it could be found, and not one weevil was seen the whole year. It is quite certain that something had occurred to diminish its numbers very greatly, and nothing had been changed except the introduction of the centipedes, so it is perhaps fair to give them the credit of the victory. There

is some confirmation of this in the fact that no new centipedes were introduced after about the fourth season, and that in two or three years the characteristic leaf-cuttings began to appear again and become more abundant. This would look as if the centipedes had diminished in numbers either by escaping through crannies in the frame work of the house, or, what is more likely, were devoured by the frogs. It would be well therefore to make an occasional hunt amongst rubbish in the garden and catch any centipedes that may be found, so as to keep up the stock in the house.

There is little more to be said. The two most important things to remember in managing a rock fernery in an unheated greenhouse are:—(1) Do not water the ferns overhead; (2) leave them without water during the winter months.

This article has been written by a town-dwelling amateur for amateurs, and gives them the result of over twenty years' experience. His fernery has not all the advantages set forth in the advice here given, for from time to time ideas have suggested themselves which it is certain would have been a great improvement had they been thought of when the fernery was being made. For instance, any stone available was used, which included much limestone, also river sand was used for the compost, which also contained much limestone sand. It took us some time to find the explanation of why some ferns—e.g., *Blechnum spicant*—utterly refused to grow with us, and we have never been able to grow them, for to do so would require complete renewal of the rockery from its foundation. One example is enough.

We fear the professional gardeners will rub their eyes, especially at the list of ferns we propose to grow without any protection from frost except the glass above them. The fernery has been visited by professionals, and when they have seen certain ferns growing luxuriantly, asked how we managed to keep the frost out in winter? and when told

that we did not, they appeared so sceptical, that we believe they did not believe, but did not like to say so. The list given is much smaller than the list tried. Many refused to adapt themselves to our conditions, so we did not persist in trying to force them to do so, but tried another kind, and so on. One example : *Pteris tremula* is a well-known, handsome common fern. It does so well in the warm weather that it is impossible to harden it off for winter, as fresh fronds go on appearing right into the autumn. The result is that they get sickly with the cold and damp off, or are actually killed by the frost. The "damping" and mildew rapidly spreads to other fronds, and the few that do not actually die are greatly disfigured and most unsightly. Nevertheless, it will probably struggle through till spring, and again make growth, but it has been thrown back so much that it has nothing of its former vigour and beauty. The second winter, if there is any decided frost, usually finishes it. On the other hand, *Pteris tremula crispa* seems more hardy, and we have had a plant growing well for the last six or eight years, which included, remember, the frosts of 1916-17 and the frost of 1917-18. No more severe condition could be given than to place a plant in a hanging wire-basket, within two feet of the glass roof, and one foot of the glass front, yet under these conditions we have some *adiantum*s now that were bought over seventeen years ago, and there never has been any artificial heat in the house all that time. The secret is—keeping them dry in winter. If one has succeeded in inducing town plant-lovers to try fern culture, under conditions which do not necessitate either too great sacrifice of time, too much slavery, or too much disappointment in results, one will feel that a great additional pleasure has been added to that afforded by writing these notes.

H.C.D.

Dublin, 1918.

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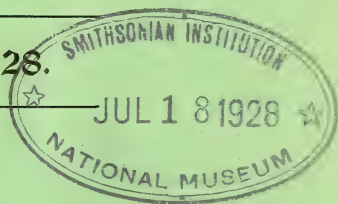
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P. angulare pulcherrimum, H. Stansfield, No. 7.

THE BRITISH FERN GAZETTE.

NEW SERIES.

VOL. V.

JUNE, 1928.

No. 10

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EDITORIAL NOTES.

We have received friendly greetings from the Editors of *The American Fern Journal* and from the Smithsonian Institution of the United States, both of which we cordially reciprocate. It is cheering that an interest should be shown by our American cousins in our activities although our work is on somewhat different lines from that of American pteridologists. The latter are chiefly occupied in working out the distribution of species on the American continent and especially in the United States. There are indications that notice is beginning to be taken of the varieties which are our main source of interest in this small and crowded country. In *The American Fern Journal* for April-June, 1916, is an interesting account by Mr. Amedée Hans of a sowing of *Scolopendrium vulgare*, in which appeared a few stray seedlings of *Asplenium trichomanes*. One of these was different from the rest and as it developed it turned out to be *A. trichomanes confluens*, thus giving colour to the suggestion (first made by the present writer some twenty years ago to Mr. Druery) that *confluens* might be a hybrid between *Scolopendrium* and *A. trichomanes*. A figure is given of several fronds of the seedling and it corresponds with our *confluens* except that the pinnae are more distant than we usually see them. This

may, however, be due to the plant having been drawn up by close cultivation. Another communication (*Journal*, March, 1928) refers to a find of a plant of *Athyrium filix-foemina* having some of the fronds "skeletonized" while others are normal. Figures are given of both kinds of fronds and it is evident that the fern is a *lineare* form of the Lady fern. We are here quite familiar with this type of variation in *Polystichum angulare* and *Lastrea filix-mas*, and it is not uncommon for some of the fronds to be normal especially in the young state. It has also been found in *Athyrium*, e.g. the varieties *Girdlestoneii* and *abasilobum*. The present writer found one in Wales in 1919, but it was accidentally lost before we reached home. *The American Fern Journal* is the official organ of the American Fern Society, and the Editors will be pleased to send specimen copies to any of our members who may be interested. Application may be made to Dr. R. C. Benedict, Brooklyn Botanic Garden, 1000, Washington Avenue, Brooklyn, N.Y.

The Corporation of the Borough of Southport announce that at the Southport Flower Show to be held on August 22nd 23rd and 24th, a number of valuable prizes will be offered for British ferns in several classes, including :—

- (1) A group, open to all, of Hardy British Ferns, to occupy not more than 100 square feet. For this group the First Prize is £15 with others of £12 10s. 0d. and £10 respectively.

Other classes, open to amateurs and gardeners, are :—

- (2) Twelve British Ferns species and varieties, in pots not exceeding 8 inches in diameter.
- (3) Six Hardy British Ferns, dissimilar, in pots not larger than 6 inches in diameter. Variation from normal types will be considered a strong point in this section.
- (4) Three Hardy British Ferns in 6-inch pots. The plants to be variations from normal types which originated as *wild finds*.

- (5) Three Hardy British Ferns in 6-inch pots, which had their origin in gardens in the British Isles.
- (6) One Hardy British Fern (in 6-inch pot or smaller) being a variety or hybrid raised from spores on the premises of the exhibitor.

There are two points of special interest in the above classes : (i) the insistence on the ferns being of British origin, and (ii) the discrimination between wild finds and garden-raised varieties. The latter is, we believe, quite new to exhibition schedules in this country. These classes have been arranged at the suggestion of our member, Mr. A. J. MacSelf, Editor of *Amateur Gardening*. The Editor of the *Gazette* has been invited to act as judge along with Mr. MacSelf. We look forward to an interesting series of exhibits and hope there may be plenty of competition.

Several new members have joined the Society since our last issue and one, who had resigned, has withdrawn his resignation and paid his subscription. The Hon. Treasurer, Mr. Sheldon, will be pleased to receive payment of any due or overdue subscriptions.

OUR FRONTISPIECE.

P. angulare pulcherrimum, H. Stansfield, No. 7.

We present a reproduction of a photograph of a very fine *pulcherrimum* which was sent to the Editor as a small seedling in 1926. It has not yet reached adult size, but already shows splendid character and seems a fairly robust grower although not approaching in this respect *pulcherrimum* No. 5 of the same raiser (also a 1926 seedling), which has already a luxuriant crown of fronds 30 inches in length, of some of which the lower pinnules measure 3 inches in length these being again divided and sub-divided. We had a photograph taken from a last year's frond of this plant which was very much admired, but the new fronds, not yet fully matured, are so much superior to the 1927 crop that we decided to use

instead No. 6, the fronds of which are a little more mature. We hope to present a figure of No. 5 in some future issue. The trouble with these very choice ferns is that they are so difficult of propagation, the only method being by bulbils and offsets which appear somewhat infrequently, and are difficult to rear when they do appear.

THE ANNUAL MEETING.

The Annual Meeting of the Society will be held at the 'Digby Arms Hotel,' Sherborne, Dorset, on September 3rd at 10 a.m., where accommodation can be had for members at 18s. per head per day inclusive. Probably other accommodation may be available, but we have no other definite information. Members who wish to attend should make arrangements with the Manager, Mr. A. L. Carpenter, as early as convenient.

The district is one which has not been seriously explored for ferns and we are informed that *Scolopendriums* are particularly fine and abundant along the roadsides. *Scolopendriums* indicate lime, and lime, in this district, indicates *angulare* and variations. The Dorset-Somerset border has always been found profitable hunting ground and we hope once more it will not disappoint us. We regret to have to abandon the idea of a Meeting in Ireland this year on account of the few members who would be able to attend it. The place of meeting for 1929 will have to be discussed and settled at the coming gathering and members who have decided views on the subject will do well to attend or otherwise to notify the Hon. Secretary of their wishes.

OBITUARY : H. STANSFIELD.

It is with feelings which it would be almost indecent to express that we chronicle the death, from pneumonia, of Mr. Herbert Stansfield, of Sale, on April 28th, at the age of 72 years. He was a born fern-lover, his father and grand-

father both being enthusiastic fern-growers and the family connection with the fern trade, now brought to an end, has lasted for the greater part of a century. It is not known when Abraham Stansfield, the grandfather of our late member, first began to grow ferns, but he was born in 1802 and studied and collected ferns as a youth. He took up their cultivation as a business probably in the early forties of the last century and published a catalogue in 1852. The grandson, Herbert, took to ferns as quite a small boy and grew a small lot in a frame some 4 feet square when he was about ten years old. All through life he has been faithful to the fern cult and has raised hundreds of thousands of them from spores, including many new varieties. His first success (though this was a joint affair) was the raising of sporelings from *Athyrium f.f. acrocladon*, which had previously been considered a barren fern. Among the offspring were *A. f.f. unco-glomeratum* and *A. f.f. velutinum*, two ferns which are still unsurpassed as examples of crestring. The former is also interesting for its biological characteristics of induced apospory and bulbil bearing. From *A. f.f. Kalothrix* he raised the sub-varieties *K. foliosum*, *K. lineare*, and *K. cristatum*. He crossed *Lastrea alpina lepidota* with *L. dilatata polydactyla* and *L. d. grandiceps* producing *lepidota polydactyla*, *lep. cristata*, and *lep. grandiceps*. He raised many curious and interesting crosses between varieties of *Scolopendrium*, especially *S.v plumosum*, a cross between *laceratum* and *crispum diversifrons*. Messrs. Birkenhead raised *P. angulare plumosissimum*, but Stansfield was the first to raise plants from its aposporous tips. He afterwards raised many aposporous forms from the *plumose-divisilobe* strain, including the *pellucidums* and new forms of *plumosissimum*, all of which were splendid things, but mostly difficult to keep. Perhaps the most valuable fern raised from this strain was *P.a. divisilobum plumosum foliosum*. This went to Reading into the hands of Mr. T. E. Henwood, where it still remains as one of the landmarks in his collection.

It is not only a fine thing in itself, but is still more remarkable in its offspring inasmuch as the wonderful *pulcherrimums* can be, and have been, raised from it. The subject of this notice has raised more of these than all others, the writer having no fewer than seven of them in his possession, all free gifts, and all raised at Sale from this one parent. There are others in the collections of Mr. Cranfield and Mr. Henwood, and doubtless many more, at present untraceable, which have been sold or given away as promising seedlings. Another very fine thing raised at Sale is *P.a. plumosum rarefactum*, from which the present writer has raised a number of beautiful things, including *pluma-Paradisæ*, which was figured in the *Gazette* in October, 1923. Last of all was a series of hybrids between *P. angulare congestum* and *P. acrostichoides*, a North American species. These are as remarkable as the hybrids raised by Messrs. Perry, of Enfield, between *aculeatum* and *munitum* and referred to in the last number of the *Gazette*.

Mr. Stansfield was a frequent contributor to the *Gazette* and many members have written appreciatively of his articles. He leaves a widow and one daughter, his only son having died, like so many others, as the result of service in the war. There is no natural successor to the fern business and the large stock is to be disposed of as soon as possible.

F.W.S.

The Rev. Canon Hawkins, of Stroud, sends the following tribute to his memory :—

“ His many friends, and truly they were many, heard with deepest regret of the passing of Mr. Herbert Stansfield, of Sale.

“ I should like to pay my tribute of respect to his memory : I knew him well and for many years past.

“ His was a striking and a very winning personality. I often marvelled at his profound knowledge of ferns over a world-wide range, at his skill in growing them, and his constant successes in developing new and beautiful forms.

Love of beauty rather than freakish types especially appealed to him. These were his characteristics and with them one saw his humility and his utter absence of self-assertion : he always saw the best in his friends.

“ He was so lenient and patient over our failures : he spared no pains in his letters of advice and instruction : he gave generously and forgave fully, over and over again..

“ I treasure his letters with an affection second only to that which I extend to his plants.

“ I recall that some years ago he spent some time in North Wales, taking with him some plants of the Killarney fern, which he planted in some wild and congenial places, with the hope that they may be found subsequently by fern hunters. This thoughtfulness was ever typical of him. He did very little fern-hunting himself, yet he was unstinted in his praises over the successes of the hunters. Spore sowing moved him more to wonder, for his productions of the best forms of the *P.a. divisilobes* were marvellous. Though he did not think much of names, I always thought his names were apt and meaningful : there was at times a touch of humour in them which appealed to some of us.

“ Love of ferns was deep-seated in him : it descended from father to son for several generations.

“ To the inner circle of his family, and to his brother, our good friend, Dr. Stansfield, in the name of all his friends, and with much respect, I beg to offer our sincerest sympathy.

“ Our grief is real, yet it is but a light affliction for a moment compared with theirs.

“ His memory and his ferns will be treasured by us for years to come.”

E. H. HAWKINS.

FERNS IN DEVONSHIRE.

In one of his books the late Mr. C. T. Druery says that varieties will seldom be found where a specific fern grows abundantly. It is true in my experience of Devonshire plants. There are records of thirty-one species for the county, and of these I have found seventeen, nearly all in profusion where they occur.

Only twice have varieties been discovered. Once it was a couple of plants of a forked form of *Asplenium trichomanes*: old large specimens growing in a hedge, with ten-inch fronds. The other find was a pair of crested *Scolopendriums*, in a small, rather dry, copse: also old plants with huge fronds. These two were taken to the garden close by and did well that season in large pots. In the autumn they were planted out; next year and ever since the new fronds have been poor small examples normal in shape. It seems fairly certain that the hunt for species would have revealed varieties, as even species need an eye ready to notice "something new" or "different." *Polystichum aculeatum* was found as the latter. In a lane where *P. angulare* was as common as usual, a slight difference suddenly made itself felt. Inspection proved the presence, for barely a quarter of a mile, of *P. aculeatum* as well as *angulare*, neither being abundant just there. My specimen, taken in 1923, has doubled in size and does well in its present Staffordshire home. Here it is supposed to take the place of *angulare*, but if it does it is hardly less uncommon. I have only seen it once.

Asplenium lanceolatum turned up on a cliff-side some 200 feet above the sea as "something new." It was only on examination at home, with reference point by point to Lowe's "Native Ferns," that identification seemed sure. As this was supported by Kew I feel happy about the record. One plant (and a number of fronds) went with me and lived for a year in nothing but wet moss in a pot. Absence from

home then brought disaster. But I live in hopes of a visit to that cliff again.

In the same way *Asplenium ruta-muraria* and *Ceterach* are very local. Devon is full of old mortared walls, but not of their Rue. It was found growing most freely on a road bridge, in mortar hardly yet decaying. *Ceterach*'s appearance is capricious. In its best station it lined the walls on both sides of a lane, but more thickly on that facing north. In two other instances it looked westwards. Books say that these two species are naturally rock plants. It is curious that in this part of Devon they occur apparently only on walls. One wants to know where the rock-inhabiting plants are which gave rise to the wanderers into artificiality. Spores must be carried to great distances. There is no doubt of that in the case of Fungi. Unless someone has taken it, there is an *Asplenium marinum* on the inner face of a wall at Harlech Castle, about half a mile from the beach. Kingsbridge Estuary, in South Devon, is a tidal creek four miles long. At the land end a few specimens of *A. marinum* were growing—at least some years ago—in a muddy earthy bank just above high water mark.

My finds did not include any rare species. Devon's chief boast is of the size to which its ferns attain. But the County has its rarities. *Adiantum Capillus-Veneris* is one. This has been claimed for Staffordshire: Garner, in his "Natural History of Staffordshire," says that he was told it grew in the Manifold Valley. But neither he nor anyone since ever saw it there *in situ*. It is more natural in a county where *Embothrium coccineum* grows 25 feet high, smothered in flower. Reports of "rare ferns" need careful handling. Nearly twenty years ago *Asplenium viride* was recorded from Dartmoor, but the claim is doubtful at best. I was told that a "rare species" grew in a damp, thick wood: minute and frequent search failed to produce anything approaching rarity. But mistakes about ferns are common. A salesman

in a famous Midland market once offered me a prolific *P. angulare* as a "Hardy Royal Fern." The cultivation of ferns as merely decorative accessories is the greatest hindrance to interest in them. It is possible that fern-lovers may look to rockery owners for a change of view. Amongst the latter there is springing up a habit of growing many of their best plants as real pets. And no plants respond better to such a feeling than ferns.

E. A. ELLIOT.

A FERN SANCTUARY FOR STAFFORDSHIRE.

We learn from our member, the Rev. E. A. Elliot, that a Nature Reserve has been formed at Hawksmoor, North Staffs, and it is proposed to form colonies of the fern flora which formerly existed in the county, but of which it has been, in great measure, denuded. We applaud the scheme, which might well be copied by other counties and districts, and commend it to our readers. If moderate colonies of wild species can be established, and protected from marauders, they may reasonably be expected to form nuclei from which the species may spread over a wider area. If any members of our Society, or other sympathizers, have surplus garden specimens of any species to give away they will be appreciated by the committee and the givers will be performing a real service to lovers of nature in the county. It is not suggested that wild ferns should be uprooted because this would only be, at best, "robbing Peter to pay Paul," but there are many gardens where wild species spring up from stray spores and these can be utilized with advantage. Communication may be made to Mr. J. R. B. Masefield, Rosehill, Cheadle, Staffs, who will be glad to receive and acknowledge them.

THE LIFE AND DEATH OF CHOICE FERNS.

“ I charge thee, Cromwell, fling away ambition
For by that sin the angels fell.”

The death of my best *angulare pulcherrimum*, apparently from senile decay although only about twelve years old, brings to my mind the words of Wolsey when “ vaulting ambition had o’erleaped itself ” and he had fallen from the royal favour. The *angulare pulcherrimums* seem to be somehow lacking in vital force and it is a question whether they are not too good to live or, as Artemus Ward puts it, “ too smart for this yearth.” As many as sixteen plants have been found wild, but only two of them survive to-day as *pulcherrimums*, although one or two others remain as renegades. Mr. Moly found at least six, some of them of a hair-raising character, but “ although tended with the most loving care they refused to stay in this world ” with the exception of the two above mentioned. In addition to the wild finds quite a number have been raised from spores mostly by Mr. H. Stansfield, but others by Mr. Cranfield and myself. Now it is difficult enough to raise *pulcherrimums*, but it is still more difficult to keep them when raised ; and the more refined and perfect they are in character the more liable they are to “ give up the ghost.” My brother’s No. 1, figured in the *Gazette* in September, 1914, was one of the most refined ever raised. It never again reached the degree of development shown in the figure although even then it had only three fronds. It lacked vigour and seemed fatigued after producing two or three fronds and then required to rest for the remainder of the season. It lived until 1927 and seemed then fairly healthy, but shows no sign of growth this spring, and, I fear, must be reckoned a loss. My own No. 1 was the best out of a large batch of seedlings. It was at its best in 1922 and was exhibited at the Society’s Meeting and figured, somewhat imperfectly, in the *Gazette* (Vol. IV, No. 12). It was then an apparently robust and vigorous plant. Next year it was still fine, but not quite so vigorous,

and in the succeeding years it has got gradually smaller and feebler although treated with all the respect and consideration due to its quality; this year it failed to start at all. At the post-mortem examination it was found that there was a core of decay extending through the centre of the caudex from base to summit. *P.a. pulcherrimum*, *H.S. No. 4*, was an equally beautiful thing and, at the top of its form in 1926, received a certificate at the Society's Annual Meeting. Next year it began to fall off in vigour, but now seems to be reviving. Moly's variegated *pulcherrimum* is one of the most difficult ferns I have ever grown. I have kept it nearly forty years and have given away scores of plants raised from its bulbils. Most of these, so far as I can discover, have died and I am now reduced to two plants, one of which looks as if Azrael had breathed upon it. It now rarely produces a bulbil although twenty years ago almost every frond used to produce at least one near its base. These were always rather difficult to rear and frequently failed to take root even when coddled and humoured in every possible way. *Pulcherrimums*, however, are not the only ferns which seem naturally short-lived. The *pellucidums* and *prothalliferums* and the ultra-plumose section generally have the same delicacy of constitution. Many of this section have flourished for a time, but after attaining the highest beauty have gradually (or sometimes suddenly) declined and either died or become permanent invalids. Nearly all these are aposporous forms and there seems to be an association between this abnormality and a frail hold upon life. This peculiarity is not confined to *angulares*, although it is in this species that it is most noticeable. *P. aculeatum pulcherrimum* (wild find) is a vigorous grower of easy cultivation. The more extreme *gracillimums* are less vigorous, but fairly reliable under good cultivation. They very rarely show apospory and Mr. Smithies is, I believe, the only person who has succeeded in raising plants from *aculeatum* through this

phenomenon. The fimbriate *crispums* in *Scolopendrium* rarely flourish for more than a season or two and then lose their fringed character and become rather stunted *crispums*, which, however, produce spores from which fresh *fimbriatums* can be raised. The only aposporous *Lastrea* (Cropper's *apospora cristata*) is a poor grower and difficult to keep, although it is easy to raise fresh plants by apospory. Colonel Jones's *Athyrium* f.f. *clarissimum*, on which apospory was first discovered, is a good grower and not at all difficult if reasonably treated. Bolton's form, which, at one time, seemed likely to surpass the original Jones form, has, however, apparently been lost although I still have a plant, raised from it by apospory, which at one time was a great beauty, but is now a renegade. The *plumose* forms of *Asplenium marinum* are difficult to keep although not aposporous and the *microdon* forms of *A. lanceolatum* and *A. Adiantum-nigrum*, with which may be associated *A. trichomanes confluens*, are also miffy. *A. trichomanes incisum Clementii*, the most truly *plumose* form of this species, is a vigorous grower, but becomes tired when it has formed a large clump and if this clump be divided there is considerable risk of losing the lot. Shall we then renounce our ambition of raising and growing the highest and most beautiful of ferns? There are plenty of beautiful things which are good growers and require no fuss to keep them alive. Fifty years ago or so there was a song the burden of which was "Love not—the thing you love may die." Although it had a certain vogue I doubt whether anyone ever took it seriously. Away with such base and cowardly whinings! It is better, a thousand times, to have loved and lost than never to have loved at all. Our dear ones were lovely and pleasant in their lives: they were happy with us and we with them.

"Gather ye roses while ye may." Although our *pulcherrimums* and other treasures may die we have been thrilled by their beauty and the experience has been worth while. We shall

continue to raise fresh and more beautiful types of fern loveliness although their beauty may often be short-lived. I have some six or eight new *pulcherrimums* (mostly raised at Sale) coming on which I hope will equal if not surpass anything previously found or raised, and there is always the hope that one or more may appear which will have a constitution equal to "Moly's green" and will continue to delight us, and perhaps our descendants, for generations. Even if all should die it is worth while to have them for are we not all mere temporary phenomena and human life itself but "the momentary play of an Ephemeron over the waters of eternity?"

"The cloud-capt towers, the gorgeous palaces,
The solemn temples, the great Globe itself,
Yea, all which it inherit, shall dissolve
And, like this unsubstantial pageant, faded,
Leave not a wrack behind."²²

F.W.S.

FERNS SUITABLE FOR A BEGINNER.

In commencing a collection of ferns the tyro generally begins with a few which may be given to him by friends, or more rarely with one or two which he may have found himself. It happens, however, not infrequently that a man may see a fine collection in the garden of a friend or a striking group at an exhibition and may be suddenly fired with an ambition to grow a collection himself. In these cases the tyro generally wants to begin with the very best things he has seen—to begin, in fact, at the level which others have gained after many years of struggle and experience. We have known many cases like this and, though the beginner, if wealthy and able to secure a skilled gardener, may sometimes succeed almost at once, it much more frequently happens that the ambitious tyro comes to grief and his attempt ends in disappointment and perhaps disgust. The average beginner will be well advised to start with a few kinds of comparatively easy culture and to advance by degrees to greater heights of glory. There are plenty of beautiful ferns which are simple in their

requirements, which can be procured at small cost, and can be easily replaced in case of initial failure. If successful with these he will gain confidence and knowledge, and can then proceed to deal with more difficult subjects. We append a list of ferns which may be recommended to the beginner upon which to try his 'prentice hand. All of them are fine things and none of them is a disgrace to the very best collection. It is not suggested that this nucleus should be discarded as the grower acquires experience : rather should the nucleus be cherished and reinforced. Remember that *Lastrea filix-mas* and its allied sub-species and their varieties are the most enduring of ferns and will not die except under the most outrageous ill-treatment. Next come the *Athyriums*, which are of the easiest culture if given shade, shelter, and water. The above will grow either in the presence of lime or in its relative absence. *Scolopendriums* and *Polypodium vulgare* and *P. calcareum* like lime and so do *Polystichums*, especially *angulare*. *Lastrea dilatata*, *L. montana*, and *Blechnum* dislike lime extremely and will not thrive if there be much of it in the soil. *Scolopendriums* like shade and moisture, but not stagnant moisture. They generally do better in the open ground than in pots. *Polystichums* in the South and West do well in ordinary garden soil if given a moderate amount of shelter from wind, and shade from direct sunshine. *Osmunda* will do almost anywhere if given sufficient water and a peaty soil, but dislikes exposure to the full sun, although it will not refuse to live even under this disadvantage. The requirements of *Lastrea thelypteris* and *L. cristata* are similar. The beginner had better confine himself to the genera and species above named until he has acquired some experience. Now for the list :—

Athyrum f.f. *acrocladon*.

„ „ *congestum* and *congestum minus*.

„ „ *cristatum* or *cristulatum*.

„ „ *percristatum*, Cousins.

- Athyrum f.f. plumosum*, Horsfall.
 „ „ *plumosum divaricatum*.
 „ „ *setigerum*.
 „ „ *Victoriae*.
Blechnum spicant serratum, Airey.
 „ „ *cristatum*.
Lastrea filix-mas fluctuosa.
 „ „ *linearis*.
 „ „ *Bollandiae*.
 „ *pseudo-mas cristata*.
 „ „ *crispa cristata*.
 „ „ *crispa gracilis*.
 „ „ *polydactyla*, Dadds or Wills.
Osmunda regalis cristata.
 „ „ *purpurascens*.
Polypodium dryopteris (lime-hater).
 „ *Robertianum* (lime-lover).
 „ *vulgare Cambricum*.
 „ „ *grandiceps*, Forster.
 „ „ *pulcherrimum*.
Polystichum aculeatum densum.
 „ „ *pulcherrimum*.
 „ *angulare acutilobum*, Hartley.
 „ „ *congestum*.
 „ „ *cristatum*.
 „ „ *divisilobum*, Bagg.
 „ „ *plumosum*, Wollaston.
 „ „ *divisilobum plumosum*.
 „ „ „ *stipulatum*.
Scolopendrium vulgare crispum, Gray.
 „ „ *crispum latum*.
 „ „ „ *nobile*, Bolton.
 „ „ *crispissimum*.
 „ „ *cristulatum*.
 „ „ *laceratum*.
 „ „ *sagittato projectum*.

HARDY EXOTIC FERNS.

*Adiantum pedatum.**Polystichum acrostichoides.*,, *munium.*,, *setosum.**Struthiopteris Germanica.*

The beginner who has only a few square yards of ground obviously cannot grow all the ferns in this list, but in selecting from it he cannot go far wrong.

CORRELATION OF CHARACTERS IN BRITISH FERN VARIETIES.

(Paper read at the Society's Meeting, Bournemouth, August 7th, 1905.)

In studying the phenomena of variation in British Ferns the observer cannot fail to be struck by the frequency with which certain characters crop up in association with each other; this, too, not only among seedlings under cultivation (where possibly the associated characters may be derived from a common ancestor in which they were combined), but also in wild finds occurring in widely separated localities, so that any question of common ancestry, except that of the parent species, is practically out of the question. Some of these correlations of character are, in some measure, dependent the one upon the other, and therefore in no way surprising. In other cases, however, the correlated characters appear to be quite independent of each other, and the cause of the association, in the present state of our knowledge, is a mystery.

In the first group of cases (*i.e.*, where the cause of correlation is more or less intelligible), I may mention the association of sterility or imperfect fertility with the plumose character. In this case the complete or partial sterility is probably the effect of the plant's vital energy being used up in the excessive development of the vegetable parts. It corresponds to the

weakness and frequent sterility which are often found in individuals of the human species who attain to gigantic stature. It is comparable, also, in some measure, with the excessive development of flesh and fat in artificially sterilized animals, such as capons and bullocks. Although the true *plumose* forms are barren as a general rule, there are many which are more or less fertile, and indeed most of them, under exceptionally favourable conditions, are capable of occasionally producing spores. *Polystichum angulare plumosum*, Patey, *P. aculeatum pulcherrimum* (which I consider to be really a plumose form), *P. angulare divisilobum plumosum* in its various types (including the finest of all *Baldwinii*) are occasionally fertile. Esplan's form of *divisilobum plumosum* was at one time abundantly fertile, but, with me at least, this form is now and has been, like the rest, for many years absolutely barren. *P. angulare plumosum grande*, Moly, and *P. ang. plumosum*, Elworthy, have never been known to bear spores, but it is quite likely that if any of these were well grown and completely watched for many years, even they might be found to occasionally bear a few spores. (This idea is suggested to me by the analogous cases of *P. ang. plumosum*, Patey, and *P. aculeatum pulcherrimum* both of which were regarded for many years as absolutely barren forms.) The same may be said of Barnes's and Wills's plumose forms of *Athyrium*. *Polypodium v. Cambricum*, which is the typical plumose form of *P. vulgare*, is barren in its original form, but there is or was, I think, a fertile form, though whether this was derived from ordinary *Cambricum* or was a separate find I do not know. The point is, however, that all these fertile plumose forms, whether of *Athyrium*, *Polystichum*, *Polypodium*, *Lastrea*, *Scolopendrium*, or *Asplenium*, are much less fertile than the species and frequently remain barren for long periods. The fertility is a sort of vital spurt and is rarely, if ever, kept up as a regular phenomenon.

Another example of correlation of characters is that of cruciate or bifid pinnæ with a truncate apex of the frond. The oldest cruciate forms are Elworthy's cruciate *angulare* and Miss Field's cruciate *Athyrium*. Both these have blunt ends to the fronds and doubtless the one character is quite in harmony with the other, inasmuch as the cruciate pinna is an abortion of the terminal part of the pinna and an over development of the two basal pinnules. It is not surprising, therefore, that the apex of the frond itself should show a tendency to abortion. In other cruciate forms which have been found or raised, such as Pritchard's cruciate *Athyrium* and some seedlings which have been raised from Elworthy's *Polystichum*, the cruciate character is only found in the lower two-thirds, more or less, of the frond while the upper third or so is normal but somewhat narrowed; in these, as might be expected, the truncate apex is not found, but the frond runs out to a fine point.

Another association of characters is found in the drooping crests of the true grandiceps forms of *Polystichum angulare* and *Aculeatum*, *Athyrium filix-fœmina*, *Lastrea filix-Mas*, and *L. montana*. In all these species the grandiceps form is that in which the frond rises narrow and almost erect until, at about an eighth its length from the apex, it suddenly breaks up into a series of branches which run up at acute angles with each other and almost parallel to the original line of the rachis. At this point the huge head folds over and hangs downwards, so that a well grown specimen has somewhat the outline of a narrowish vase with a heavy turned-down collar or rim. This association of characters may be explained by the suddenly increased weight of the terminal portion of the frond acting upon the narrow neck and causing it to bend downwards.

Less easily explained is the correlation of the acutilobe and divisilobe characters with the production of buds or bulbils upon the rachis and stipes. As you all know, the acutilobe,

divisilobe, and multilobe characters are closely connected ; they, in fact, merge into one another, and it is often quite difficult, and not rarely impossible, to draw the line between them. A form which is merely an acutilobe under ordinary conditions will frequently, under high cultivation, or in a very favourable season, become a divisilobe. The proliferous character is almost invariably found to some extent in this, which I may call the lobed, section, using this term to include the acutilobes, multilobes, and divisilobes. As you know, the first recorded form of this division was acutilobum Choules, which was named (by Moore, I think), simply proliferum, on account of its bulbiferous character. As other acutilobe and divisilobe forms appeared they were, for some time, all called proliferum, with the addition of some proper name, generally that of the finder, to distinguish one from another. Thus one remembers proliferum, proliferum Wollastonii, Footii, Holeanum, Crawfordianum, Henleyæ, Allchinii, and others, before the division into acutilobum and divisilobum was thought of. The proliferous character was seized upon as the most important, although some of these, such as proliferum Crawfordianum (found by our president), were, and are, very sparingly or only occasionally proliferous. An acutilobe form of aculeatum was also found and duly named aculeatum proliferum, although it did not appear at first to be proliferous at all. I well remember my grandfather protesting against the absurdity of calling a thing proliferum which was not proliferous at all, merely because it resembled in other respects forms which *were* proliferous. It turned out, however, that this form did occasionally produce bulbils, although it often fails to do so for years in succession, especially if grown in a somewhat dry atmosphere. When the proliferum group became unwieldy from the number of forms it contained it was split up by Wollaston and Jones into the three sections acutilobum, divisilobum and multilobum, and the proliferous character was entirely disregarded. In this matter I think

they were quite right because, although the proliferous character is most noticeable in the lobed section, it is found more or less in every section, and may be occasionally met with in almost every variety. I fear I cannot hazard a suggestion why the bulbiferous character is so often correlated with divided or acute lobes.

Another series in which the correlation is quite as mysterious is in the brachiate forms, and especially the brachiate-cristate varieties. As you know, this section is regarded as being of a somewhat fickle disposition, the cristate and also the brachiate character often disappearing for years together to reappear at uncertain and irregular intervals. When the brachiate character does appear, however, it is generally, though not invariably, found to be associated with a very peculiar and beautifully acute toothing, or cutting of the pinnules. This character is well seen in the nature-print by Col. Jones of brachiato-cristatum, Padley, and also, less distinctly, in some of his other prints. A brachiatum may be sometimes recognised by this peculiarity when it has quite lost its nominal character. I well remember the original plant of Moore's brachiatum at Todmorden thirty-five years ago, when it was, for this reason, a beautiful object, although not brachiate at all. I show you some of Col Jones's prints of brachiate forms in which this peculiar cutting is seen as well as one in which it is not. I am unable to suggest any cause for the correlation of character in this series of forms. Although it is by no means invariably found, yet it is too frequent to be merely accidental and there must be some mysterious connection between the two.

Another curious coincidence, even if it be nothing more, is the association of the polydactylous character in the pinnæ of two similar forms of *P. angulare* (*viz.*, Padley's Vale of Avoca polydactylum and Jones's Hampshire find of the same type) with normal undivided apices to the fronds, *i.e.*, in the mature plant. What is still more remarkable is the fact

that in all seedlings raised from these, and even when they are crossed with other varieties the young plants come for the first year or two with large solid terminal crests, which character rapidly disappears as the plants become older, until when the fronds are a foot or eighteen inches in length the heavy crestring is replaced by plain undivided apices and fingered pinnæ, the fingers themselves being all sharply pointed. Another curious peculiarity which runs all through the strain is the lack of thoroughness in the polydactylous character—*i.e.*, when the plant is mature, if not before, there are always a few pinnæ which are plain and undivided, like the apex of the frond. This polydactylous strain has been crossed with *acutilobum*, *divisilobum*, *multilobum*, *divisilobum plumosum*, *lineare*, *pulcherrimum*, and other strains, and in every case, so far as I have seen, the same series of changes is found in the young plants and the same peculiarities in the adult.

The correlation with apospory of the peculiar character to which in *Polystichum angulare* the name of *pulcherrimum* has been given (although in other species this name is unfortunately associated with quite different characters) is well known but quite unexplained. Of course apospory is not confined to ferns having this character (*i.e.*, long, drawn out, falcate lower pinnules), yet wherever this character is found, so far as I am aware, there also is apospory, and there also, as a rule, is a peculiar type of sterility so far as spores is concerned. Sori, or something like sori, are produced in plenty, but as a rule the sporangia are empty and, in some cases, even these are absent, or nearly so, the sori being represented by indusia only or by wartlike lumps of cellular tissue which are capable of being developed into prothalli under favourable conditions. There is, so far as I know, no instance on record of a *pulcherrimum* of this kind reproducing itself from spores. What is still more remarkable is that, when young plants are raised by apospory, the offspring, as a rule, bear no resemblance

to the parents, but are abortions of the most distressing and disappointing character. There are exceptions to this rule, however, for I have myself raised two plants practically like the parent from Moly's variegated pulcherrimum. I have also raised plants by apospory from Moly's green pulcherrimum from Mrs. Thompson's and from Willis's form, and from one other very fine pulcherrimum raised at Sale, but now, I regret to say, lost. None of these plants, with the exception of the two I have mentioned, bore any varietal resemblance to their respective parents, but oddly enough they bore singular and deplorable resemblance to each other, being all irregular and depauperate forms. The late Col. Jones regarded Clarissima in *Athyrium* and the fimbriate crispums in *Scolopendrium* as the analogues of pulcherrimum in *angulare*, and this view is supported to some extent by their being capable of apospory. An *Athyrium*, however, much more closely resembling *angulare pulcherrimum*, in fact identical in character with it, was raised a year or two ago by Mr. Druery from Bolton's aposporous *Athyrium*, but unfortunately this, like many pulcherrimums in *angulare*, proved inconstant and degenerated into normal *flix-fœmina*. I have, I think, told you the story of this fern before, but tell it again partly because it fits in with my subject and partly because I think there is hope that another of the same kind may be raised either from Bolton's *Athyrium* itself, or from some of its offspring. This is, so far as I know, the only instance of the true "*angulare pulcherrimum*" character having been found in any other species. The correlation of characters in this fern completes the analogy with *angulare pulcherrimum*, for besides the pulcherrimum form we had also apospory and alas! inconstancy. It is possible that *Cornubiense* in *Polypodium* *vulgare* may be at least partly analogous to pulcherrimum in *angulare*, for here we have correlated fine subdivision with inconstancy; apospory has not yet been found in this form, but I strongly suspect that it might be induced by cultivation in a constantly moist atmosphere. The analogy is perhaps

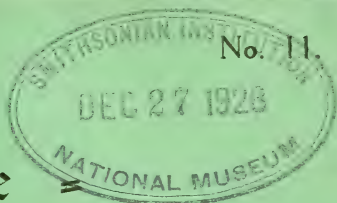
as close with Birkenhead's *angulare plumosissimum* as with the *pulcherrimum*s, inasmuch as the former turns out on cultivation to be much less freely aposporous than at first appeared. It is, in fact a true plumose-divisilobe form when grown in the open air, and only develops its aposporous character when grown in a warm moist atmosphere. Even then it does not produce true prothalli immediately but only apical growths, which are capable of being developed into prothalli with considerable difficulty on separate cultivation. I fear I am wandering slightly from my subject, for *plumosissimum* shows no special correlation of character, except those of sterility with plumation. Possibly it may turn out to be, like the other plumose divisilobes, capable of occasional fertility.

There is one other instance of correlation of character to which I have not yet alluded, viz., the occasional production of tiny bulbils in place of sori on the plumose forms of *Athyrium*. This phenomenon has been found on the *Axminster plumosum*, *plumosum elegans*, *plumosum Druery* and *plumosum divaricatum*. I am not aware of any other case in *Athyrium*, though possibly others may be. I have, however, on more than one occasion, detected it on *Polypodium Cornubiense*, which is either a plumose or (as Col. Jones said of the *ang. pulcherrimum*) an ultra-plumose form. It may be looked for in partially barren plumose forms of *P. angulare*, *Lastrea montana*, and of any species in which such may occur.

I have now mentioned all the important types of correlation of characters in the varieties of British ferns which occur to me. Doubtless other instances will occur to some of you. I have not attempted to solve the problem or to explain the why and wherefore, but possibly in the suggestion that there is such a problem there may be the germ of usefulness. If so this scrappy, and I fear somewhat incoherent, paper will not have been written quite in vain.

F. W. STANSFIELD.

VOL. V.



= The =

British Fern Gazette.

December 1928.

EDITED BY

F. W. STANSFIELD, M.D., F.L.S.

(120, OXFORD ROAD, READING.)

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THE BRITISH PTERIDOLOGICAL SOCIETY

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Hon. Secretary : Dr. F. W. Stansfield.

Hon. Treasurer : Mr. J. J. Sheldon, "Monkhams," Lower Road, Great Bookham, Surrey.



Blechnum sp. ramo-cristatum, Blow.

THE BRITISH FERN GAZETTE.

NEW SERIES.

VOL. V.

DECEMBER, 1928.

No. 11

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EDITORIAL NOTES.

The Southport Show, to which allusion was made in our last issue, turned out to be, in every respect, a gigantic success and not least in the department for British Ferns. We publish in this number a report of the exhibition by Mr. A. J. MacSelf, to whose energetic advocacy the establishment of the fern classes was largely due. We hope that next year the ferns may be a still more prominent feature, although this year's exhibition undoubtedly stimulated interest in ferns in the North of England as well as in Scotland and even in Ireland. We suspect that the comparative paucity of the display in the "small classes" was largely due to the restrictions as to size of pots, as it was obvious that some of the ferns shown had been badly punished by being forced into too small pots, while, in other cases, plants insufficiently developed had been chosen in order to make them fit the standard sizes of pots. Pots should be chosen to fit the ferns and not the ferns to fit the pots.

We have received a copy of *The Daily Colonist* of Victoria, British Columbia, which contains an account of the unique (in that country) collection of ferns grown by our veteran member, Mr. Joseph Wiper, formerly of Kendal. We quote therefrom the following extract :—"Mr. Wiper is said to have the largest collection of British ferns in Canada and his

collection includes many of the rarer native ferns which he has collected in British Columbia and other parts of the Dominion. Despite his eighty-four years, Mr. Wiper takes a most lively interest in his collection and delights in showing his treasures to interested callers. The commercial aspect of fern collecting does not interest him ; he grows them solely because he knows and loves them. The long botanical names are on the tip of his tongue as he points out individual specimens, which, to the casual observer, seems an art in itself. For to admire a fern for its beauty is one thing ; to understand it is another." It may be noted that Mr. Wiper is one of the few surviving founders of the Society, the initial meeting of which was held at his house at Kendal on September 23rd, 1891. Mr. Wiper was appointed the first Treasurer of the Society and retained that office until 1903. He was elected an honorary member in 1904, and migrated to Canada in 1912. May he live long to spread the cult in the great Dominion.

OUR FRONTISPIECE.

Blechnum spicant ramo-cristatum, Blow.

We have pleasure in presenting an illustration of a fern found near Axminster by Mr. T. B. Blow on the Society's excursion in 1926 and for which he was awarded the Society's Certificate in 1927. The photograph shows a plant in which the ramose character is more prominent than the cristate, but nevertheless most of the branches are terminated by small crests and it seems likely that this character will be more conspicuous as the fern becomes more mature. In any case, it is a fine variety, quite distinct from any *Blechnum* previously found. The illustration is from a plant in the Editor's collection, given to him as a small plant soon after the fern was found.

OBITUARY : BOWLES.

We deeply regret to announce the sudden death on October 27th of Mrs. Anthony Bowles (formerly Miss Gladys Cranfield).

a most amiable lady and the well-beloved daughter of our esteemed President. The deceased lady, who went to Ceylon after her marriage three years ago, had recently visited her native country, when we had the pleasure of meeting her, apparently in perfect health, at her father's house. She had only just returned to her home in Ceylon, when she was struck by a sudden illness (cerebral malaria), which terminated fatally after two days. Her loss will be mourned by a large circle of friends, and the sympathy of all will go out to her husband and to her father and his family. Mr. Cranfield has suffered a succession of bereavements in a comparatively short time at the hand of the "Reaper whose name is Death."

"Shall I have nought that is fair," quoth he—

"Have nought but the bearded grain ?

Though the breath of these flowers is sweet to me

I will give them all back again."

THE ANNUAL MEETING.

The Thirty-third Annual Meeting of the Society was held on Monday, September 3rd, 1928, at the Digby Hotel, Sherborne, Dorset, the President, Mr. W. B. Cranfield, occupying the Chair. Members were present from Enfield, London, Welwyn, Great Bookham, Warlingham, Horsham and Reading. The minutes of the previous meeting were read, confirmed, and signed by the President.

The President welcomed the members and gave some outline of the activities of the Society during the year.

The Hon. Secretary read his report as follows :—

"Mr. President : the number of ordinary members of the Society is now 118 and there are six honorary members.

Mrs. Gregg, of the Palace, Dublin, has resigned her membership.

Mr. Herbert Stansfield, of Sale, has died.

Two members have been lost sight of, letters to them from the Treasurer having been returned marked "Not known" ; these are Mr. F. C. Whiteley, of Shipley, Yorks, and Mr. J.

Whitton, V.M.H., Bellahouston House, Glasgow. [It has since been ascertained that Mr. Whitton has died.—*Ed.*]

Forty-two new members joined the Society between the last annual meeting and the issue of the December (1927) *Gazette*. Their names will be found in the list of members published in that issue. Members who have joined since that time are :—

Messrs. Carter & Co., Raynes Park, Wimbledon.

Mr. John Cochran, 5½, Nursery Street, Kilmarnock.

M. Paul Kestner, F.L.S., Chailly Village, Lausanne, Switzerland.

Mr. G. W. Leak, 1, Clarkson Avenue, Wisbech, Cambs.

Mr. George Munro, Church End, Finchley, N.

Mr. Arthur Osborne, 83, Abbey Street, Faversham, Kent.
Saorstát Eirann (The Irish Free State).

Mr. J. K. Woodmansey, Knaresborough, Yorks.

Mr. F. J. Hanbury, F.L.S., was invited to become an honorary member, but preferred to be an ordinary member, and his name will be found in the list. Mr. Hanbury invited the members to visit his charming garden at Brockhurst, East Grinstead, and a party of some 12 or 14 members and friends spent there a pleasant afternoon on June 16th last. An important feature at Brockhurst is the rock-garden, which contains many interesting and rare plants, including a considerable number of British and other hardy ferns, which the party spent some time in naming. The large and rich collection of orchids was inspected and duly admired, while a plant of the rare British Lizard Orchis in flower in the open garden was an object of special interest to some of us. Mr. and Miss Hanbury afterwards entertained the party to tea."

The Hon. Treasurer, Mr. J. J. Sheldon, presented his financial statement as follows :—

BALANCE SHEET.

INCOME.	£	s.	d.	EXPENDITURE.	£	s.	d.
Balance from last year	34	7	7	Affiliation fee, R.H.S.	2	2	0
Subscriptions received	46	5	0	"Gazette," Dec., 1927	14	19	6
Sale of "Gazettes"	1	0	0	„ June, 1928	13	2	6
Advertisement ...	2	2	0	Stationery & Printing	7	18	0
				Postages, etc. ...	2	19	7
				Cheque Book ...		2	0
				Balance in Bank ...	43	11	0
	£83	14	7		£83	14	7

Audited and found correct, September 3rd, 1928.

(Signed) PERCY GREENFIELD.

It was resolved that the Hon. Secretary's and Hon. Treasurer's Reports be received and adopted.

The Officers and Committee for the ensuing year were elected as per the following list:—

President :

Mr. W. B. Cranfield.

Vice-Presidents :

Mr. Alex. Cowan,	Rev. Canon Kingsmill Moore,
Mr. T. E. Henwood,	Mr. J. J. Smithies,
Rev. Canon Hawkins,	Mr. G. E. Stephens.

Hon. Treasurer :

Mr. J. J. Sheldon.

Hon. Secretary and Editor of The Gazette :

Dr. F. W. Stansfield.

Hon. Auditor :

Mr. P. Greenfield.

Committee :

Mr. T. B. Blow,	Dr. S. P. Rowlands,
Mr. T. Brown,	Dr. T. Stansfield,
Mr. P. Greenfield,	Mr. J. A. Sinclair,
Mr. A. J. MacSelf,	Mr. F. W. Thorrington,
	Mr. R. Whiteside.

It was resolved, on the proposition of Mr. Blow, seconded by the President, that Miss Irma Andersson, of the John Innes Institute, should be invited to become an honorary member.

It was resolved, on the proposition of the President, seconded by Mr. T. E. Henwood, that a letter of condolence be sent to Mrs. H. Stansfield and her daughter.

It was proposed by the President, seconded by Dr. F. W. Stansfield, and resolved, that a vote of thanks be passed to Mr. A. J. MacSelf for his advocacy of British Ferns (i) in his paper, *Amateur Gardening*; (ii) in connection with the Southport Horticultural Show.

A communication was read from Dr. S. P. Rowlands to the President suggesting that more members should assist the Editor by sending contributions to the *Gazette*.

A letter was read from Mr. A. J. MacSelf to the President suggesting that the name of the Society should be changed from its present Greek form to the Anglo-Saxon equivalent of the British Fern Society. Mr. MacSelf also asked for a definition of the meaning of "tall varieties" and "dwarf varieties" as applied to British Ferns in some exhibition schedules. Considerable discussion took place on the subjects of this letter and, while the general feeling seemed to be against a change in the name of the Society, it was recognized that there was something to be said on the other side, and it was eventually agreed that the Society should keep its original name, but that an explanatory phrase or sub-title of "The British Fern Society" might, upon occasion, be used in brackets after the name of the Society.

On the question of tall *v.* dwarf ferns, it was argued that the matter was complicated by the existence of large-growing and small-growing species, forms of the latter being usually admitted among "dwarf varieties," although they might be quite as tall as the normal species to which they belonged, e.g., *Aspleniums trichomanes*, *Adiantum-nigrum* and *Germanicum*, *Allosorus*, *Hymenophyllum*, etc. It was agreed that the Society's definition of "small-growing ferns" should be those in which the length of the fronds of fully matured specimens do not exceed twelve inches, either perpendicular or horizontal, measured from the crown or rhizome to the

tip of the frond. Small plants of large-growing species or varieties are ineligible.

It was proposed by Mr. Henwood, seconded by Mr. Greenfield and resolved, that the funds of the Society be charged with the expense of exploring a neighbourhood before the place of meeting be finally settled: tentatively the meeting for 1929 shall be held in N.W. Yorkshire, Settle or Ingleton being suggested.

A large number of fronds were exhibited by Mr. T. E. Henwood and Dr. F. W. Stansfield, and Certificates were awarded:—

- (i) to Dr. F. W. Stansfield for *P. angulare divisilobum perserratum*, Phillips, frond exhibited by Dr. Stansfield;
- (ii) to Messrs. Perry, of Enfield, for *Polypodium v. pulcherrimum congestum*—frond exhibited by Dr. Stansfield.
- (iii) to Dr. T. Stansfield for *P. angulare lineare caudatum*, wild find at Taunton—frond exhibited by Mr. Henwood;
- (iv) to Dr. F. W. Stansfield for *P. ang. pulcherrimum variegatum*, seedling from Moly's wild find: form having increased stamina and symmetry of outline—frond exhibited by Mr. Henwood.

On the motion of Mr. Blow, seconded by Mr. Sheldon, the President and Hon. Secretary were empowered to draw up a scheme for offering a Society's Silver Medal for British Ferns at provincial shows when any of the Society's officials acted as judges.

The meeting closed with a hearty vote of thanks to the President for his conduct in the Chair.

The party of members remained in the neighbourhood of Sherborne, in gradually diminishing numbers, for about a week, during which the country (especially the districts to the south and west) was explored energetically for varieties of ferns. Although the region was not so rich in ferns as some others which have been visited (e.g. S. Devon and S. Dorset) fairly good hunting was met with, and the following "finds" were made:—

- (i) A *P. angulare* (*furcillato-gracile*), having slender fronds, small pinnules, and minutely crested tips to fronds and pinnæ.
- (ii) A large ramose *Scolopendrium* similar to *S.V. ramosum majus* of Clapham (by Mr. T. B. Blow).
- (iii) A large-growing *P. angulare acutilobum* of robust habit : this plant had several crowns which were distributed among the members present.
- (iv) A *Scolopendrium v. sagittato-cristatum*, quite thorough in character and possibly capable of development to a *sagittato-projectum* under cultivation.
- (v) A *P. angulare setoso-decompositum*, very feathery and bristly in character—also having several crowns.

These five ferns were considered not a bad result for a week's hunting, and their behaviour under cultivation will be watched with interest, not to say excitement.

The following new members have joined the Society since the meeting, up to date of going to press :—

Miss Irma Andersson-Kottö, The John Innes Horticultural Institute, Mostyn Road, Merton Park, London, S.W.19.

(This lady was invited to become an honorary member, but elected to join as an ordinary (subscribing) member.)

Mr. John Grant, 7, Market Street, Turriff, Aberdeenshire.

Mrs. (Dora) Nuttall, Ingle Nook, Grindleton, near Clitheroe.

Mr. George Oliver, 10, Yarrow Terrace, Hawick, Scotland.

Mr. Robert Sutcliffe, 21, Market Street, Burnley, Lancs.

Mr. Alfred Waterhouse, East View, Warton, Carnforth, Lancs.

BRITISH FERNS AT SOUTHPORT SHOW.

There were those who, when first they learned that the organizers of Southport Flower Show had been advised and persuaded to introduce classes for Hardy British Ferns on a more elaborate scale than has been attempted by any other Show, shook their heads and made no effort to conceal the fact that they were confident only of the venture proving a fiasco. It was the expressed opinion of many that not more

than two or three growers could fill a hundred square feet with plants worth exhibiting, and that even those two or three would not care to risk damage to their treasures and incur the expense of taking them to Southport.

Events proved the doubters in the wrong, and everybody, when they saw the grand series of groups in the big marquee, enthusiastically acknowledged that the Hardy British Ferns constituted a really important feature of this, the finest all-round show the Provinces have yet seen, and it may be added that the cult of Hardy Ferns received the greatest fillip it has been given for very many years. In support of this statement the writer may say that practically every week since the Show some inquiries have been answered concerning the commencement of collections, and during the period of the Show much time was occupied in conversation with visitors who were surprised and delighted with what they saw.

Seven entries in the Challenge Trophy class surpassed our most sanguine anticipations for a first effort, and they were, with one exception, wonderful entries. One exhibitor, probably labouring under a misapprehension of the intentions and purpose of this class, brought a great quantity of normal wildlings which had obviously been newly collected for the purpose. It would, indeed, be a great pity if classes for Hardy British Ferns at Shows involved the unnecessary plundering of the countryside. The ordinary species and types thus uprooted from their natural homes can never stand the slightest chance of winning a coveted position in keen competition, and the whole purpose of the exhibition is to encourage the cultivation of Hardy British Ferns and appropriately to honour the finest examples of variation from the normal and demonstrations of cultural skill.

The spaces measured off for the seven groups were each ten feet by ten feet, and unfortunately so little space was allowed between the groups that it was difficult to see just where the dividing lines were placed. We know the reason

was that entries throughout the whole magnificent Show were so numerous that space was at a premium, but in view of the great merit of this feature we sincerely hope it will next year be possible to allot twelve feet frontage and a depth of eight feet six inches to each group with an alley at least two feet wide between the exhibits. In expressing this hope we do not wish to convey an impression of dissatisfaction with the Show management's handling of our classes ; indeed, we are anxious to place on record our great appreciation of the geniality, kindness and evident anxiety to treat everybody handsomely, which has been characteristic of Southport from the start of its great Show.

Our President is to be heartily congratulated upon being the first winner of the handsome Challenge Cup, generously provided by Messrs. Abol, Ltd. Mr. Cranfield's group contained many magnificent ferns, and embraced a wide range of species in their choicest varieties. Really, there were more plants in the group than were needed, and some splendid plants were so closely tucked in that their true beauty was partially screened. From the point of view of artistic arrangement the second prize group was to be preferred, but quality was, of course, the greater factor for the judges' consideration. Mr. Cranfield not only had rarities and particularly choice ferns of many kinds and varieties, but the plants were noble specimens, even the pigmies of the fern world being finely developed. His big plant of *Athyrium f.f. clarissima* (the original " Jones " form) was the subject of much admiration and comment, and yet the plant was less magnificent than Mr. T. E. Henwood's specimen was two years ago, when the writer had it photographed with our old friend standing beside it. Mr. Cranfield's plant had been slightly scorched by the tropical sunshine we had just previous to the Show, so that those who saw *Clarissima* for the first time at Southport may picture an even grander plant when this wonderful treasure is in its finest condition. *Plumose Polystichums* were grand in Mr. Cranfield's group, and he had

some beautiful *Scolopendriums*, e.g., Moly's *crispum speciosum* and *crispum splendens*.

The second prize group came from Shrewsbury, the exhibitor being Mr. Walter Taylor. Rock work was skilfully used in this effort, and with a steeply mounded background of the more vigorous growers the exhibitor had a small bed of choice, smaller ferns as the central feature. We liked the arrangement very much, and whilst the collection as an exhibit was well varied, it was not unduly crowded.

The third prize went to Scotland, and Mr. George Oliver, of Hawick, deserves high praise for bringing so far a wonderfully choice collection, every plant of which was an interesting and desirable unit. Even a normal *Scolopendrium vulgare*, the commonest thing in the group, was a very fine plant, and, happily placed at the foot of a sloping boulder of limestone, it certainly provided no ground for criticism. The finest plant of all in Mr. Oliver's exhibit was a superb specimen of *Athyrium unco-glomeratum*. Such a plant, so finely developed, proclaimed Mr. Oliver to be a cultivator of no mean skill. Other choice things were *Asplenium trichomanes incisum*, *Asp. fontanum*, a particularly fine form of *Polystichum lonchitis*, and some choice *Polypodiums*. There were also some nice *plumose Polystichums*, crested *Athyriums*, etc., but had Mr. Oliver been a little more furnished with large specimens for his background his position might well have been first in the list of awards. Originally three prizes were offered in this class, but so great was the all-round merit of the exhibits that a fourth prize was generously granted by the Exhibition Authorities. Such is the spirit of the Council of this Show, and it is a spirit which should induce every grower who can do so to support this Show, and make next year's Fern classes not only finer still, but conspicuously the most noteworthy feature of the whole exhibition.

In regard to the smaller classes, for stated numbers of plants in pots, we confess to some slight disappointment, for whilst seven competitors brought plants and equipment for a hundred square feet of space, only five were forthcoming in

the classes for six or three plants in pots, and these, in most instances, came from the same exhibitors. We had hoped, and in fact anticipated, that quite a considerable number of owners of small collections who could not attempt the big group would have come forward in the small classes, thus to demonstrate their interest and desire to see the cult of Hardy Ferns advanced. The plants shown in these classes included some very nice things, but nothing of superlative merit or surprising novelty was forthcoming.

Next year, we hope, the Show authorities will adopt suggestions we have already put before them for additional classes in the pot plant section, and it is to be sincerely hoped that all members of the Pteridological Society who possibly can will make real endeavour to exhibit in at least one small class.

The benefits accruing to our hobby from this first Southport venture are undoubtedly great; how great we cannot yet estimate, but the future holds possibilities beyond power of calculation—if only everyone who really loves hardy ferns and desires to see their cultivation widely extended will add his support to the efforts to make our section of Southport Show a huge success.

A. J. MACSELF.

THE FERNS (*Filicales*).

Treated comparatively with a view to their natural classification, by F. O. Bower, Sc.D., LL.D., F.R.S., Regius Professor of Botany in University of Glasgow.

Published in 1923—Vol. I.—*Analytical examination of the criteria of comparison.*

Published in 1926—Vol. II.—*The Eusporangiatae and other relatively primitive Ferns.*

And, to be issued, in 1928(?)—Vol. III.—*A working out of the natural affinities of the Leptosporangiata Ferns.*

The great object of this contribution to Fern literature seems to be the construction of a “phylogeny”—a “family

tree" for the whole Fern class. This, also, is calculated, *deliberately*, to have its profound bearing on the problem of the evolution of all our higher plants—the flowering plants, or Phanerogams. As Prof. Bower remarks in his preface to Vol. I: "Primarily it is a treatise on the Filicales; but, secondarily, it will touch broader questions of Morphology and of Evolution." Such a phrase, coming from the author of that thought-provoking book, "The Origin of a Land Flora" (published 1908) is highly significant. We look for much, yet here our highest expectations are exceeded.

I find it difficult indeed to "review" such a work as this. The amount of research it must have involved; the very mass of actual "labour" in its compilation leaves one "staggered." I am compelled to brevity. How *can* one describe an Encyclopaedia of Fern Lore? Yet the preface states: "It has not been the Author's intention to give an exhaustive summary of all knowledge relating to Ferns." One is left wondering what *could* happen if Prof. Bower really "let himself go" and *tried* to give us such an "exhaustive summary." Well, get this book—beg, borrow or steal it,—anyway, *get* it: study it, and *then* let us have your opinion as to the "comprehensiveness" of the work.

I will give a slight resumé of the Chapters: it must be *very* slight, or I shall monopolize our *Gazette*.

Volume I, Chapter I, gives "The Life History of a Fern." The example chosen is our familiar "Male Shield Fern" (*Dryopteris* (*Nephrodium*) *Filix-mas*, Rich.).

(Right here, may I intervene, with a hope that Prof. Bower's work will provide, ultimately, not only a new classification, but perhaps a new terminology? I really do not understand "Male Shield Fern." Why not simply "Male Fern?" Moreover, how one would welcome, say, *Nephrodium Filix-mas*, or even *Lastrea Filix-mas* again. Surely that terrible *Dryopteris* genus is top-heavy with its load of species, and needs re-division on familiar lines.)

That by the way. If anyone is unfamiliar with our Male

Fern after studying Chapter I, it will not be the fault of Prof. Bower. Every phase from prothallus to adult plant is analysed, even to the details of the nuclear "chromosome-cycle." Finally, a reference to the higher Algæ brings in the possible origin of the Archegoniate series from such water plants, but stresses the need for much more research by the Algologists.

Chapter II deals with "The habit and habitat of Ferns." Here the Author roams "from China to Peru," only more so, describing Ferns from all over the world. This chapter especially will appeal to Fern lovers, because of the illustrations of our beloved plants, even though they are *not* British species. For the wealth of original illustrations, we, like the Author, may well express our gratitude for "substantial assistance given by the Carnegie Trustees." Without their generous help, it is obvious, no such "figuring" could have been attempted.

Chapter III gives the Classification of Christensen (based on Engler and Prantl) in detail, compared with the systems of earlier Pteridologists, and proceeds to criticize its non-phyletic arrangement, and to seek for new "Criteria of comparison." This shows the need for a much larger view, based on *all* known characteristics of Ferns.

Chapters IV and V are concerned with "leaf-architecture," and Chapter VI with "cellular construction." The comparisons of living with extinct Ferns are of great interest. Chapters VII and VIII are highly technical and describe stem structures, while Chapters IX and X carry on this technique to the leaves and their methods of structural support. In Chapter XI we leave the "vascular" tissues and deal with "parenchymatous" tissue; also with Hairs, Scales, and a host of other intriguing appendages, which are finely illustrated.

During Chapters XII and XIII all phases of sporangia are discussed. Despite technicalities this is a real "fairy-tale" of science. The main conclusion here is the tremendous

spore-output per sporangium of "primitive" ferns, compared with the relatively "economical" expenditure of our modern Polypodiaceous Ferns.

The "Gametophyte," or "prothallus," arrives with Chapters XIV-XV, and we are given a world of comparative detail; but British Fernists will be even more interested in Chapter XVI—"Abnormalities of the Life-cycle." Here we come right up to date with research into the wonderlands of Apospory and Apomixis (the new term for Apogamy), and revel in details of cell-nuclei and chromosomes. A large number of our varietal Ferns are thus examined, finishing with crested forms.

Chapter XVII concludes Volume I by a comparison of Ferns, living and fossil, with the structure, etc., of other plants, such as the Bryophyta (Mosses and Liverworts), Algæ, and, at the other extreme, the Seed-plants.

In a postscript, emphasis is laid on the fact that Volume I has been analytical, and, it is said, the second volume will be mainly synthetic in its method.

Have I given too much space to chapter description, I wonder? I think not; for, after all, one desires to write quite a long essay on every single chapter, and I have been drastically brief. I say deliberately that in my considered opinion this work will, as Pteridologists become well acquainted with it, take a definite place as a classic of Fern lore.

I leave Volume I with amazement at the mass of information, compiled and original. It seems incredible that anything can be left for a second volume—until we get there—and then other Fern-worlds dawn on our senses.

FRANCIS W. THORRINGTON.

LASTREA CRISTATA, PRESL.

This is part of the *Polypodium cristatum* of Linnæus, the *Aspidium cristatum* of Swartz, Smith and Hooker, and *Dryopteris cristata* of the Vienna list. Several members have inquired why it is named *cristata* "when it is not crested."

It should be remembered that when the name was first given "tasselled" ferns were not known or, if they were, were regarded as mere freaks and deformities. It is said that the name *cristatum* "was bestowed by Linnæus in consequence of a fanciful comparison between the cluster of its peculiarly erect fronds and the aigrette of vertical feathers on the head of the peacock *Pavo cristatus*." The primary meaning of the word *crista* was a tuft on the head of an animal, especially a bird; afterwards it came, by transference, to mean the plume or crest of a helmet. It was probably Mr. Moore who first applied the term to the abnormal dilatations of the apices of fronds which are now commonly known as the "crests" of ferns. The species seems to be becoming much scarcer than formerly in this country on account of the drainage and cultivation of boggy places and the encroachments of civilization. Several stations where it was formerly said to grow have recently been searched in vain. Probably Norfolk is its principal remaining station, but it has been reported also from Suffolk, Nottinghamshire, Cheshire, Yorkshire and the Isle of Wight. Also from Renfrewshire in Scotland. It is odd that it has not been recorded from Ireland, where peat bogs are so numerous. It was formerly found in Switzerland, but is said to have become extinct there. Its American representative is *L. cristata Clintoniana*, which is different from the British and European type although evidently closely allied to it. It is this American fern which is mostly in cultivation in this country as *L. cristata*. The true British *cristata*, when once seen in its typical form, cannot be confused with any other species except the still rarer *L. uliginosa*, which is a connecting link between *cristata* and *spinulosa*, and is sometimes considered to be a hybrid between the two. When *cristata* and *uliginosa* are barren of spores they are very similar and can easily be mistaken for each other. When in fruit, however, *cristata* has tall, narrow and very erect fronds of which one-third or more consists of footstalk or stipes, while the leafy portion is only about two inches wide and almost the same width throughout.

Uliginosa bears fronds of at least three kinds, some of them approaching the barren fronds of *cristata* and others more divided with something of the outline of *spinulosa*, although less divided than that species. *L. cristata* is worth growing by anyone who has a boggy or damp place available and a soil free from lime, and its peculiarly erect habit renders it at once noticeable as distinct from other ferns. Its rarity in cultivation is partly caused by its not having been raised in quantity from spores which could doubtless be easily accomplished with very little trouble. It provides spores in great abundance and ought to be as easily raised as *L. dilatata* and *L. spinulosa*, which are weeds in many ferneries.

FERN HUNTING IN SWITZERLAND.

In the spring of this year a couple of members of the Society decided upon a short holiday in Switzerland. It had been intended that this should be in May, but circumstances caused it to be postponed until early June and this delay proved fortunate for it was quite early enough for the Alpine flowers and too early for the highest as one soon got among the melting snow and found some of the tracks impassable from the unmelted. Arriving at Salvan (Valais) on June 1st, about 3 p.m., the weather was damp and drizzly, but we put on waterproofs and immediately went out for a walk. Our headquarters being about the altitude of the top of Snowdon, we were among Alpine plants immediately, *Primula hirsuta* being plentiful, but past the flowering stage, and *Saxifraga aizoon* and *cuneifolia* everywhere in full flower. *Sempervivum arachnoideum* was also plentiful and another characteristic plant was *Scleranthus perennis*, a mass of sea-green bloom, the sepals having white margins. On the outside of the garden wall of our hotel we found *Sedum dasyphyllum*, *Asplenium ruta-muraria*, *A. trichomanes* and *Cystopteris fragilis*, all quite at home. In the first half-hour we found *Asplenium septentrionale* very abundant on walls and rocks, and, although the geological formation was granite, *Asplenium trichomanes* was everywhere—in fact this and

Polypodium dryopteris were the commonest ferns. This was surprising seeing that *trichomanes* is rarely found in Britain away from lime in some form or other. The first afternoon we were delighted to find two tufts of *Asplenium Germanicum* peeping from adjacent chinks of a wall. These we left alone, not intending to disturb them unless we found others to maintain the stock. We did not find any more that day, but afterwards we found it—always in isolated tufts and nearly always in dry walls—in some seven or eight different places, but we left them all undisturbed until the last day of our stay, when we decided to take *one* of our two original tufts. In order to get at the fern we were obliged to pull down the wall to the level of the plants and we then found that the two tufts were only one plant, the crown of which, deep in the wall, sent out fronds through two adjacent chinks. Determined not to extirpate the fern from this habitat, however, we divided the tuft into two portions replanting one of them with a sprinkling of fresh soil and replacing the stones exactly in their old positions. After this act of vandalism we made an excursion in a different direction, hunting specially for *A. Germanicum*, and were fortunate in finding some half dozen plants, all separated by considerable intervals and including one magnificent clump a foot across, which looked as if it had been undisturbed for a hundred years. We left them all to enjoy their solitude and to perpetuate the race if they could. We never found a colony or family of this fern, however, nor even a child, but only separate individuals. It is probably this discrete distribution of the species which has led to the theory that *Germanicum* is a hybrid and not a separate species at all. Of the upholders of the hybridity theory some consider it to be *A. septentrionale* $\times$ *A. trichomanes*, while others think it *septentrionale* $\times$ *Ruta-muraria*. Our own experience was strongly against the idea of *Ruta-muraria* parentage as in no case did we find it in company with that fern, but always with *septentrionale* and generally with *trichomanes* not far off. Britten, in his "European Ferns," says that *Germanicum* is "found abund-

antly in many localities in the Tyrol and in Silesia *where none of the other three species occurs.*" It seems probable, therefore, that *Germanicum* is really a good species and not of mixed origin. We have this year sown spores from a British specimen and, if we get a fair crop of seedlings, shall consider this pretty conclusive evidence against the hybridity theory. On the second evening of our stay we found our dinner-table decorated with a dish of flowers of *Gentiana verna* and *G. acaulis*. On inquiring where these were found, we were told La Creusaz, which is some 2,500 feet higher than our hotel. We instantly decided to go to La Creusaz and did so next day. We found it a stiff climb, which took the whole day for, although the distance, as the eagle flies, was not great, the climb was so steep that we had to walk five or six times the distance in order to zig-zag up the mountains. We were rewarded by finding many interesting plants, including *G. acaulis*, *Pyrola secunda*, *Homogyne alpina*, *Rhododendron ferrugineum*, *Polystichum aculeatum* (which we had not previously seen), *P. lonchitis*, *Allosorus crispus* (in quantity), *Pinguicula alpina*, *Veronica saxatilis*, *Orchis sambucina*, *Anemone hepatica*, *A. vernalis*, *Arctostaphylos uva-ursi*, *Lycopodium alpinum*, *Gagea arvensis*, *Polygala chamaebuxus* and *P.c. purpurea*, *Geum montanum*, *Máianthemum bifolium*, etc. We did not find *Gentiana verna* that day, but afterwards we saw plenty of it. We returned to our base tired and footsore, but happy. Another day we took advantage of a funicular railway which has been built to convey materials for the formation of a road and a storage reservoir for the purpose of developing electrical power. This took us some 3,000 feet above our hotel. Our railway carriage had no roof or sides and, indeed, no seats, in the proper sense of the word, being constructed entirely for the carriage of timber and other building materials. From our precarious perch in this vehicle we noticed many interesting plants, but were, of course, unable to examine any of them closely. Just before we reached the top of the ascent a heavy thunderstorm came on which lasted for nearly an hour,

during which we sheltered in a workmen's hut at the head of the "funicular." The storm having abated we walked along the level road leading to the reservoir and here we found *Primula hirsuta* in full flower with considerable colour range, varying from pale pink to deep rose. We collected plants of two or three of these. We also found again *P. lonchitis*, *Lycopodium selago*, *Soldanella alpina* and *Crocus vernus*, flowering among the melting snow, *Saxifraga cotyledon*, *aizoides* and *stellaris*, *Lastrea dilatata alpina*, *Daphne mezereum* (looking rather pinched), *Primula farinosa*, *Viola biflora*, etc. On June 4th, having had one or two tiring days, we decided to investigate the Gorge du Trient, a deep and romantic gorge below Salvan, through which the Trient stream rushes to join the Rhone 2,000 feet below. Here we found *Lastrea spinulosa*, *P. aculeatum*, and a wonderful tuft of *Allosorus crispus*, spores of which had presumably been brought by wind or water from the higher altitudes into the shelter of the gorge. The result was a plant with fronds 18 inches long and a foot wide. We did not find it on the Salvan level at all. Other plants of interest were *Helleborus foetidus*, *Genista sagittalis*, *Habenaria bifolia*, *Paris quadrifolia* and *Mulgedium Plumierii*, the last a beautiful blue-flowered composite, an ally of our British *M. alpinum*, which is found only on the highest Scotch mountains. We saw also *Selaginella helvetica*, which was new to us as a wild plant. On June 6th we went to Martigny to obtain the services of an "horloger," one of us having accidentally broken the glass of his watch. On the way down we still found *septentrionale* in plenty almost down to the Rhone level, but not quite. We saw also *Stachys recta*, *Dianthus armeria* and *D. Carthusianorum*, *Digitalis lutea* (not yet in flower), a large *Orchis*, which we took to be *O. fusca*, also not in flower, *Verbascum lychnitis* *Tunica saxifraga*, *Lotus tetragonolobus* and *Anthericum liliago*. Also, in a little side valley leading to a celebrated waterfall, one plant of *Asplenium Germanicum*.

On June 8th we decided to move our headquarters temporarily to the Hotel du Glacier du Triente, near the foot of a

glacier, so we took the train to Finhaut (getting a splendid view of the Aiguilles Rouges and part of the Mont Blanc range) and then walked across the Valley of the Eau Noire to the Tete Noire, finding *A. Germanicum* again in several places, but still only as isolated individuals. We saw *Lastrea montana* for the first time, although we afterwards found it nearer to our base. Another fern was *L. pseudo-mas*, Wollaston (*paleacea*, Don) with some narrow forms including one genuine *Pinderii*, the only definite fern variety we saw in all our stay. Ascending to the Tete Noire we found *Asplenium viride*, very sparingly, for the first time, its rarity being presumably due to the comparative absence of lime in the soil and strata. *P. dryopteris* was everywhere and *Cystopteris fragilis* very abundant, although in Britain it is rarely found away from the limestone. A plant new to us was *Streptopus amplexifolius*, an ally of our Solomon's Seal, but having branched stems and small solitary flowers, instead of pairs, at the nodes. We also saw a *Campanula*, not yet in flower, which seemed to be a form of *Bellardii*, but smaller and neater than the form grown in gardens in England under the names of *pusilla* and *pumila*. A *Saxifraga*, which we took to be *exarata*, turned out to be *S. mixta*, which differs from the former species in being covered with short glandular hairs. It is a neat plant, but not showy, the flowers being of a dull pale yellowish green. *Gentiana verna* was seen here for the first time—a patch half a yard across, but made up of separate single plants, each bearing one flower. Reaching the hotel about 3 p.m., after a short rest we went up towards the glacier, which was still some miles away over rough country. We passed through fields full of *Ranunculus aconitifolius*, *Colchicum autumnale* and *Orchis latifolia* and soon came across *Gymnadenia conopsea*, *Listera cordata*, *Globularia cordifolia*, *Trollius Europaeus*, *Clypeola Gaudinii*, *Polygonum viviparum*, *Polygala alpestris*, *Thesium alpinum*, *Dryas octopetala* in beautiful flower (another limestone plant), *Lycopodium clavatum* and *Botrychium lunaria*. Next day we made tracks for the actual glacier and found *Veratrum*

album very abundant. The walking was rather difficult, being steep and much impeded by snow in places. At the foot of the glacier in the moraine we found *Linaria alpina*, *Trifolium alpinum*, *Silene acaulis*, *Veronica saxatilis*, *Sax. bryoides*, *Pinguicula alpina*, *Chrysanthemum alpinum*, and *Hutchinsia alpina*. Also we were pleased to find two colour forms of *Sax. mixta*, one a clear buttercup yellow (rather a rare colour in mossy *Saxifrages*) and the other an orange-buff tinged with pink. Returning by a different track we were obliged to wade a rather deep and rapid mountain stream, the proper crossing being buried in deep snow. Shortly afterwards we noticed a large number of plants of *Athyrium filix-foemina*, some of which looked different from the rest, having a slightly yellow tinge and the rising fronds having the upper half tightly folded longitudinally, while the lower half was fully expanded; in this reminding us of the plumose forms of *Lastrea montana* rather than the Lady Fern. On examining one of these plants we found round naked *sori*, indicating *Polypodium* or *Pseudathyrium alpestre*, now classed as an *Athyrium* by modern botanists. We were soon able to pick out the *alpestre* from the *filix-foemina* a dozen or more yards away by this difference in the habit of veneration. Next day we walked up to the Col de la Forclaz above Trient and, on the way, we came across meadows full of *Anemone alpina* and its still more beautiful variety *sulphurea*, the yellow being the prevailing colour. We picked some half-dozen flowers for our table, not wishing to denude Switzerland of her flora too completely. We soon found we need not have been so sparing as we met a youth of the country with both arms encumbered by huge bundles of the flowers. Slightly above the Col we found *Gentiana verna* extremely abundant, but still always as single shoots, each with a solitary flower. The following day we walked to the nearest station on the mountain railway some four or five miles away and, finding we had a couple of hours to spare, we walked over the frontier into France and there found *Gymnadenia albida*, which we had not seen in Switzerland. Here

also we met again a fellow-countryman who had stayed at the same hotel the previous night and had started off early in the morning to walk into France over the Col de Balme. He had, however, been compelled to turn back, the pass being blocked by deep snow. Returning to Salvan we found several ferns, etc., which we had previously missed in the neighbourhood, viz., *Lastrea montana*, *Asplenium Adiantum-nigrum* and *Lycopodium clavatum*, and a number of interesting bog plants.

The following is a list of the ferns seen :—

Asplenium Adiantum-nigrum—rare.

„ *Germanicum*—rare.

„ *septrionale*—very plentiful.

„ *trichomanes*—very plentiful.

„ *viride*—very rare.

„ *Ruta-muraria*—only on mortared walls in villages.

Ceterach officinarum—rare and mostly high up.

Allosorus crispus—local, but moderately plentiful when found.

Athyrum alpestre—rather rare.

„ *filix-foemina*—not common.

Blechnum spicant—rather uncommon.

Botrychium lunaria—local.

Cystopteris fragilis—very abundant and widely distributed varying from *forma dentata* to some almost as finely cut as *C. alpina*. We failed to detect the true *alpina*.

Lastrea dilatata—rather uncommon.

„ „ *alpina*—only high up.

„ *filix-mas*—not abundant, but found high up in exposed places as well as lower down.

„ *paleacea*—local.

„ „ *Pinderii*—only one plant.

„ *montana*—rather rare.

Polypodium Robertianum—very scarce and local.

„ *dryopteris*—very plentiful.

„ *phegopteris*—less plentiful, but not rare.

Polystichum aculeatum—rare.

Polystichum lonchitis—local and only high up.

Pteris aquilina—only occasional.

(*Scolopendrium vulgare*, *Polystichum angulare* and *Polypodium vulgare* were not seen. We were surprised also at not finding *Lastrea propinqua*, which is an abundant mountain fern in Britain.)

Returning home we decided to break our journey at Lausanne in order to call upon a new member of our Society, M. Paul Kestner, whose home is one of the most beautifully situated places we have ever seen. He, and his English wife, received us most hospitably and we spent a few hours very pleasantly in their company. M. Kestner showed us his method of raising ferns from spores which was on a different plan from any we had previously seen. The spores were sown on natural soil from the woods, which seemed to consist mainly of white sand with a slight admixture of vegetable mould. A thin stratum of this was placed upon strips of unglazed porcelain, something like our celluloid labels and these were inserted into test tubes and the latter closed by well-fitting rubber stoppers. There was, thus, complete control over both the atmospheric moisture and drainage. M. Kestner said that "every spore" germinated, but he found it necessary occasionally to take out the stoppers to introduce some carbonic acid gas, the supply of which would otherwise have been insufficient for the needs of the growing prothallia. He also found it useful occasionally to stimulate the germination of the spores by the introduction of a little ether vapour. We discussed with him our want of success in finding *Cystopteris alpina*, which he explained by saying that *alpina* is a limestone plant, whereas we had been hunting almost exclusively upon the granite and other siliceous formations.

F.W.S. and P. GREENFIELD.

[We hope shortly to be able to give our readers a short paper from M. Kestner describing in greater detail his method of raising ferns from spores.—*Ed.*]

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(120, OXFORD ROAD, READING.)

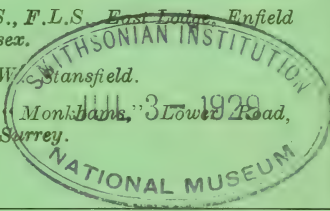
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Polystichum angulare divisilobum plumosum deltoideum.

THE BRITISH FERN GAZETTE.

NEW SERIES.

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EDITORIAL NOTES.

The present number completes our fifth volume and a glance through the numbers shows that the Society and its members have passed through troublous times during the period of their appearance. The losses by death of members and their families have been very heavy and we fear that the losses also among ferns, especially during the past winter, have been exceptionally great. It has been one of the worst periods we have ever encountered and many things which survived the severe frost seem to have had "the heart taken out of them" and are failing to grow even though still alive. The full story cannot yet be told, but it is certain that many valuable things have disappeared. On the other hand, the Society has been reinforced by many new members, some of whom have already rendered yeoman service to the cult, and we trust that the ferns lost from some collections may be preserved in others and that new forms will continue to be raised from spores as well as found wild.

Our President has arranged to deliver a lecture on British Ferns before the R.H.S. on July 16th next.

Professor F. O. Bower, F.R.S., etc., the second volume of whose book on Ferns is reviewed in the present issue by Mr. Thorington, and whose Presidential Address to the York Naturalists' Society is reported by Dr. Rowlands, has been elected an Honorary Member of the Society, and has expressed his thanks to the President and members for the honour thereby rendered to him. We are pleased to welcome this eminent botanist on his becoming "one of us." He will be somewhat of a Triton among the minnows, but this is the proper rôle for Honorary Members.

Mr. T. B. Blow, F.L.S., recently read a paper before the Linnean Society, describing his work in the investigation of the alleged larvicidal properties of plants of the order *Characeæ*, in the island of Madagascar. The *Characeæ*, although not ferns, are fern allies and there was a tradition that in the pools where they were abundant mosquitoes did not breed. Mr. Blow's experiments showed, however, that these plants had no larvicidal properties so far as could be discovered. At the same Meeting, Mr. James Groves, F.L.S., described a number of species of *Chara* and *Nitella* collected by Mr. Blow in the course of his investigations. These included several new species and varieties, and among the former one has been named *Nitella Blowiana* in honour of the discoverer.

Mr. Blow informs us that the Hertfordshire County Council has made a new bye-law to the effect that "No person shall (unless authorised by the owner or occupier, if any, or by law, so to do) uproot any ferns or other plants growing in any road, lane, roadside waste or other place to which the public have access." We commend the enterprise of this progressive Council and hope its example may be followed by other public authorities: otherwise our country seems likely to be shortly denuded of its most interesting and beautiful wild plants.

We have received from the Brooklyn Botanic Garden, New York, a number of leaflets which are being distributed

widely in the United States. One of them, of special interest and written by Dr. R. C. Benedict, is entitled "How shall we save rare plant species from extinction?" In it an appeal is made to the common sense of the public for the preservation of rare and uncommon species of plants and animals. A hope is expressed "that legal protection for plants will be recognised in all States before long and that educational measures will be increasingly effective in creating a proper public opinion on the subject. In the meantime, more immediate measures must be taken if we are to preserve those species most in danger of extinction." The special measures immediately suggested are:—

- (i) The artificial propagation and restocking of native plants ;
- (ii) Plant sanctuaries.

The Hart's Tongue fern is a rare species in the States, and hundreds of plants of this have been raised from spores in the Brooklyn Botanic Garden and distributed for planting in suitable localities. The leaflet continues: "It might seem that State reservations would help in preserving rare plants, but the recent development of two areas in New York indicates the contrary. When the Green Lake, west of Jamesville, was set aside as the Clark Reservation, nearby residents felt an *increased right* to carry away ferns for back-yard gardens. At Chittenango Falls, also a fine hart's tongue locality, the State itself has been responsible for destroying most of the fine colony of this fern in the development of the path system." It seems that the same problem is beginning to be felt in America which exists in our own much smaller country.

We have received a copy of the Schedule of the Sixth Annual Southport Flower Show, in which substantial prizes are again offered for British Ferns in eleven classes, ranging from "A Group of Ferns to be arranged in a space not exceeding 100 square feet" (Class 8) to "One hardy British Fern to be a variety raised from spores in the garden of the

exhibitor" (Class 18). There is thus plenty of scope for both large and small growers and we hope many of our members will compete in some of the classes.

Our member, Miss Irma Anderson-Kottö, of the John Innes Horticultural Institution, has published in *Hereditas* a Genetical Investigation in *Scolopendrium vulgare*. The investigation is on the same lines as that pursued by the same worker which was briefly reported in our issue of June, 1927. We hope to give a more extended account of this recent research in our next issue.

New members who have joined the Society since our last issue are :—

Mr. Robert Bolton, F.R.H.S., and Mr. Thos. Henry Bolton, F.R.H.S., both of Broadbrook, Halstead, Essex.

Mr. Reginald Kaye, Coombehurst, East Grinstead, Sussex.

Mr. Joseph Lloyd, 4, Richmond Road, Birkdale, Southport.

Mr. F. P. Le Riche, Halburton, Hastings Road, Jersey, C.I.

Mr. Edwin Westley, 2865, Nina Street, Lamanda Park, Pasadena, California, U.S.A.

The Hon. Treasurer, Mr. J. J. Sheldon, will be glad to receive remittances from any members whose current subscriptions remain unpaid.

OUR FRONTISPIECE.

Polystichum angulare divisilobum plumosum deltoideum.

We have pleasure in presenting a reproduction of a photograph of an exceedingly fine form of the plumose-divisilobe strain of *P. angulare*. The fern was grown and the photograph was supplied by Mr. W. B. Cranfield, who had it as a seedling from the late Mr. H. Stansfield, by whom it was raised. It is equal, if not superior, to anything previously raised in this section which represents the very cream of British ferns. The plant was grown in the open air and the frond shown is not an exceptional one, but a fair sample of what the fern ordinarily produces. The actual dimensions are : width of

frond across basal pinnae 28 inches ; length from basal pinnae to tip of frond 29 inches ; height of bare stipes 4 inches. The plant is constant in character and the fronds even and regular in outline, while the cutting is quadripinnate to subquinquepinnate.

THE SEPTEMBER MEETING.

The Annual Meeting of the Society will be held at 10 a.m. on Monday, September 2nd, at the Ingleborough Hotel, Ingleton, Yorks. Accommodation may be had at the hotel at an inclusive charge of about 12/- per day. Members who intend to be present are advised to write as early as possible to the proprietor, Mr. Arthur Camm, in order to secure rooms. Our energetic member, Mr. T. B. Blow, has visited and surveyed the locality and has also secured the good-will of several local landowners so that members will be able to botanize in peace without being regarded as trespassers or marauders. As it is some years since the Society had a Meeting in the North it is hoped that a fair contingent of Northern members may be present, while the Southern members will meet with a change of scene and a different series of species from those found in the South and West. The hunting will be more strenuous than in the lanes and by-ways of Devon and Dorset, but the change will be good for us and we trust that the wilder country may be more prolific in varieties as well as giving a change of species. A different set of flowers will be found in addition to the ferns. The geological formation of Ingleborough, is mainly limestone and should give us *Aspleniums*, *Scolopendrium*, *Lastrea rigida*, *Polypodium Robertianum*, etc., while away from the lime we shall doubtless find our old friends *Lastrea montana* and *Blechnum spicant*, the Oak and Beech Ferns, and the Lady Fern, while we may hope to meet with *Lastrea cristata* and *uliginosa* as rarities.

OBITUARY.

GREENFIELD : On February 14th, at Beech Bank, Warlingham, Surrey, Elsie, the beloved wife of Percy Greenfield, and elder daughter of F. W. Stansfield, of Reading.

STANSFIELD : On February 16th, at Sale, Sarah Jane (Janie), widow of the late Herbert Stansfield, of Sale.

BUCHAN-HEPBURN : On May 17th, 1929, after a long illness, Sir Archibald Buchan-Hepburn, Bart., of Smeaton Hepburn, East Lothian. Although known only by name to many of our members, Sir Archibald was a benefactor to the Society in times of stress on more than one occasion. He had been a member from the early days of the *Gazette* and was the finder of a distinct *ramosissimum* form of *Scolopendrium*, which was described on p. 34, Vol. IV. of the *Gazette*.

THE FERNS (*Filicales*), by Prof. F. O. Bower, F.R.S., etc.
Continuation of Review. Vol. II. (pub. 1926). The Eusporangiatæ and other relatively primitive Ferns.

The Introduction recapitulates the "twelve leading characteristics of Ferns," selected as the basis for new "criteria of comparison," in Vol. I. These are :—

1. The external morphology of the shoot.
2. The initial constitution of the plant-body as indicated by segmentation.
3. The architecture and venation of the leaf.
4. The vascular system of the shoot.
5. The dermal appendages.
6. The position and structure of the sorus.
7. The indusial protections.
8. The characters of the sporangium, and of the spores.
9. The spore-output.
10. The morphology of the prothallus.
11. The position and structure of the sexual organs.
12. The embryology of the sporophyte.

In quoting these in full, I wish to emphasize the wide sweep of the new botany in its investigations. Most of the classification of the older pteridologists would appear to have been almost exclusively based on Nos. 6, 7, 8 and 9.

These twelve "criteria" in Vol. I. were used to "embody" an archetypal Fern—the kind of plant that may be envisaged as the "beginning" of all our Fern worlds. This "came out as a plant not unlike the type of vegetation characteristic of the Devonian Rhynie Flora," which result, despite Dr. Bower's modesty of claim, must be held as considerable proof of the reality of the conception. This, however, is only "a trial trip," as it were. The great test of these "criteria" then comes with "the application of this method of analysis to the Ferns at large with a view to their seriation in time." "If it appears that the phyletic grouping thus arrived at for modern Ferns harmonizes with the appearance of the various families in successive geological ages, then it may be confidently felt that we possess a morphological weapon that has real value."

Volume II deals with this, and endeavours to reconstruct a phylogeny for our modern Ferns.

Chapter XVIII.—Leaving the Introduction, we begin Volume II with the *Coenopteridaceæ*, which includes the *Botryopterideæ*, the *Zygopterideæ*, and the *Anachoropterideæ*, all known only as fossils from the Palaeozoic rocks, and "distinct from any living Ferns." The main interest here for British Fern students lies in that remarkable section of *Zygopterids* (the *Dineuroideæ*, *Salmi*), whose fronds bore four rows of pinnae. Prof. Bower remarks that this four-rowed *Zygopterid* "may well be accepted as the result of a very early dichotomy of each pinna of the single-rowed type." We, naturally, think of our three-rowed *Blechnum*, but I gather from correspondence with the author, that the British varietal plant could only be regarded as "homoplastic." How much one would have liked to observe progeny from that *Blechnum* which died, alas!

Chapter XIX takes us to the *Ophioglossaceæ*, which seem to stand by themselves among modern Ferns, and “appear to have terminated as a blind evolutionary series, and they stand to-day as an imperfectly modernised relic of the Palæozoic Flora.” An interesting point is that many of the *Ophioglossaceæ* “are strongly mycorrhizic,” i.e., they act in partnership with fungal hyphæ, much as in the symbiosis of Alga and Fungus which constitutes a Lichen.

Chapter XX deals with the *Marattiaceæ*, fossil and recent. They have only seven genera of living Ferns, but their record goes back to the Palæozoic, when many were giant Tree-ferns. Their main interest lies in their sporangia, which were often welded together into “synangia,” as in the modern type genus *Marattia*.

Chapter XXI gives us the *Osmundaceæ*, and again we go right back to the “primitive” Ferns, for the Order seems to have sprung from some such types as the *Botryopterids*. Many fossils are referred to this group, and, on the whole, it is intermediate in position between Goebel’s types, the *Eusporangiatæ* and the *Leptosporangiatæ*.

The *Schizæaceæ* are in Chapter XXII, with four living genera, and a fossil record going back to early Mesozoic time. This is a fascinating chapter, with many delightful illustrations. The only detail I dare give space to concerns the extraordinary prothallia of the *Schizæas*, as in *S. pusilla*. These have filamentous prothallia “in point of fact the simplest prothalli known among the *Pteridophyta*.” “They suggest a primitive state and provoke comparison with green *Algæ*.” If, as is suggested, the fungal infection of these prothalli is mycorrhizic, they might almost be called “lichens” if we were unaware of their development to a Fern.

Chapter XXIII.—Here we have those strange “Ferns,” the *Marsileaceæ*, of which our *Pillwort*, *Pilularia globulifera*, is the only British example. There are three genera: *Marsilea*, with no less than 56 species; 6 species of *Pillworts*; and a new genus, *Regnellidium*, from Brazil, with only one

species. We have been accustomed to regard these plants (of which the exotic forms might, at a careless glance, be taken for "four-leaved Clovers," or, perhaps a better idea, "four-leaved Shamrocks (*Oxalis*)") as near to *Salvinia*. However, as this analysis proceeds, with delightful illustrations of the details of development and structure of the "sporocarp," we find, to our wonder, that inside these peculiar "spore-fruits" there is practically a miniature "fertile frond" of a Fern, rolled up with a gelatinous ring. The *Salvinia* likeness decreases and we discover that the real relationship is to a true Fern like *Schizæa*. Another "fairy-tale of science."

The *Gleicheniaceæ* occupy Chapter XXIV; the *Matoniaceæ*, Chapter XXV, and this completes the Ferns known as the Simplicies, while XXVI is devoted to a review of these relatively primitive types.

In Chapter XXVII the *Hymenophyllaceæ* appear. These interesting "Filmy Ferns" are shewn to have many primitive features, despite the relatively high structure of their sporangia. Many of them are remarkably like Liverworts, while again in *Trichomanes* the prothallus consists of "coarse branched filaments, in habit like a green *Alga*." It is evident why many early Pteridologists sought to relate these Ferns to *Bryophyta* or archegoniate *Algæ*. We are told that this Order is "probably of early origin, but ending in a blind line of descent, characterised by specialisation of both generations to a hygrophilous habit, which takes the form of simplification."

I fear I must condense Chapters XXVIII to XXXIV, though there is much one would like to dilate upon. The Orders described are the *Loxsomaceæ*, *Dicksoniaceæ*, *Plagiogyriaceæ*, *Protocyatheaceæ*, *Cyatheaceæ*, and *Dipteridaceæ*. The very names evoke interest, but I must refer the reader to the book—the mass of detail is too great for quotation.

Chapter XXXV sums up the results of Volume II, quoting the survey of the Simplicies in Chapter XXVI, and going on to summarise the results of Chapters XXVII to XXXIV

as exhibiting more advanced Ferns, many with sori of a "Gradate" type. One of the main changes is the parting of *Dicksoniaceæ* from *Cyatheaceæ*, "a separation which is long overdue." Apparently, the mere sharing of dendroid habit seems to have kept these two groups "unequally yoked." There are four "maps": "A" giving present and past distribution of *Gleicheniaceæ*; "B" the same for *Matonia-Dipteris*; "C" for *Schizæaceæ*; and "D" for *Marattiaceæ*.

The volume closes with an attempt at "a phyletic tree" of the more primitive groups of Ferns, and a suggestion of the derivation from them of "six large phyla" comprising the great mass of the *Leptosporangiate* Ferns—i.e. our "modern" fern-flora as a whole. (See "Phyletic Scheme" traced from illustration on p. 288.)

We look like having many surprises when Volume III goes into these matters in detail. Doubtless, there will be many battles amongst the Pteridologists, but one gladly welcomes the new light thrown on the old problems of grouping and hopes for a basis that one can *realize* as having a "natural" sanction.

Finally—pending the arrival of Volume III—it would be well for all Fern-lovers to study Professor Bower's Presidential Address to the Yorkshire Natural History Society, which has now been published in the December issue of the *Naturalist*. This throws, by anticipation, much light on the conclusions we may expect from Volume III, and is really a delightfully written "popular" description of our fern-flora in Britain and its origins—obviously penned by a real "devotee" of Ferns.

FRANCIS W. THORRINGTON.

LASTREA CRISTATA, PRESL.

It was thought that the following notes, additional to those by Dr. Stansfield in the December number of the *British Fern Gazette*, might be of interest.

As a British plant, this fern is undoubtedly getting very scarce. This is, of course, due mainly to the extensive drainage of marsh lands that has been carried on in recent years, but even where its old haunts have been left almost untouched, the plant seems to be disappearing. For instance, Professor Carr, of Nottingham, states that he found plenty of *Lastrea cristata* in Oxtou Bogs twenty years ago. Three separate searches for it in this locality during the last two years, however, failed to reveal a single plant. The other Notts locality—Bulwell Marsh—is now a golf links ! Drainage probably accounts for its disappearance from Thorne Waste, near Doncaster, where it occurred at least up to 1872, but hardly for its disappearance from Askham Bog, near York, where one or two plants were seen lingering as late as twelve years ago. It is, I understand, extinct in Staffordshire and possibly in Cheshire also.

Dr. Stansfield expresses surprise that it does not occur on the peat-bogs of Ireland. I saw a fair number of specimens of this plant in North America before the war, and from my experience of it there, it did not seem as if a peat-bog were quite the most likely place in which to find it. One saw it rather in wet open woodland. Dr. Lowe, speaking of the Oxtou habitat, says : “ All the plants I have seen are growing amongst grass in lumps of soil that are elevated a foot or so above the bog, especially on the sides of large tufts of *Aira caespitosa*.” This fern, therefore, while requiring an abundance of moisture, seems to prefer sweeter, less acid, conditions than is suggested by the term “ peat-bogs.”

Dr. Stansfield states that “ its American representative is *L. cristata Clintoniana*,” which might be taken to mean that the *cristata* type is not found there. This is not the case. Both occur, but the variety *Clintoniana*, almost twice the size of the type, is much rarer than *cristata* itself. Mention of *L. uliginosa*, a supposed hybrid of *L. cristata* and *L. spinulosa* reminds one that in North America *Lastrea cristata* is considered to hybridise rather readily with other members of the

genus, such as *marginalis* and *Goldieana*. The former, particularly, is a distinct and well-marked plant which I myself found on one or two occasions. *Lastrea spinulosa* occurs in North America, but I do not remember hearing of a hybrid identical with our *L. uliginosa*.

Like the Royal Fern and other plants which normally grow within reach of constant moisture, the Crested Buckler can stand a good deal of exposure to sunlight. When growing under exposed conditions, I frequently noticed that the pinnae tended to rotate so as to occupy a horizontal position, like the laths of an open Venetian blind, giving the plant a distinctive appearance. This habit, obviously acquired to reduce evaporation by lessening the surface exposed to the sun's rays, I cannot remember having being mentioned in any published account of this species. Our American friends could probably give some interesting information regarding this plant.

S. P. ROWLANDS.

[We have to thank Dr. Rowlands, and one or two other correspondents, for pointing out that *L. cristata* (type) occurs in America as well as *L. Clintoniana*. This is indeed recorded in the Floras both American and European. It is admitted that even "the good Homer sometimes nods." There is plenty of ground in Ireland where *cristata* might well find a home, though the bare "turf" bogs which are so common in that country are not quite the places.—*Ed.*]

THE EVOLUTION OF BRITISH FERNS.

It was my privilege, in December, 1928, to hear Professor Bower deliver his Presidential Address to the Yorkshire Naturalists' Union at York. Professor Bower's name is already well known to members of the British Pteridological Society, and in the last number of *The Fern Gazette* a review was given of the first volume of his *magnum opus* on *The Filicales*. Older members will recollect Professor Bower's association with the late Mr. C. T. Druery in the discovery and the working out of the details of Apospory.

Professor Bower's Lecture was entitled "The Evolutionary Relations of the British Ferns." The subject was of extra-

ordinary interest and was, as may be supposed, dealt with in a masterly fashion. I am pleased to have the Lecturer's personal permission to give an account of it in *The Fern Gazette*, and in doing so have made full use of detailed notes taken at the time. In some instances I have ventured to quote the Professor's own words.

Professor Bower, after some interesting opening remarks in which he outlined the changing and widening attitude of botanists to questions of Ecology and Morphology, stated that while eight families of Ferns had already been distinguished before Darwin published his "Origin of Species," their relation in descent had never been defined. It was as recently as 1890 that the view was put forward that the most primitive ferns were the most massive in structure, with the number of spores in each spore-case running into hundreds or even thousands. These were styled *Eusporangiates*. The later developed, derivative types were more delicate in structure, with a spore count per sporangium measured in tens or less. The term *Leptosporangiates* has been given to these. Geology has confirmed these views, and it is found that all the Palaeozoic ferns are relatively massive *Eusporangiates*, those typical of the present day being *Leptosporangiates*. A marginal position of the sorus is also considered a primitive feature, whereas ferns with superficial sori are considered as more recent or derivative. A phyletic scheme was formed and it was Professor Bower's task to fit into this scheme the living British Ferns. It was pointed out that there were some families not now living in Britain which had representatives in our Fossil Flora.

The first question was whether any representatives of the Palaeozoic Flora still existed in this country. The *Ophioglossaceæ*, it was suggested, may be related to primitive ferns, particularly to the *Botryopterideæ* which flourished in the coal age, but early fossils relating to the *Ophioglossaceæ* have not been found. On the other hand, there are no

known derivatives of these ferns, so at the most they can only be considered as "imperfectly modernised relics of the Palæozoic Flora."

Our Royal Fern is, however, undoubtedly of an ancient type. Its thick upright rootstock, suggesting a Tree Fern, its distal trusses of marginal sporangia containing relatively numerous spores, and its characteristic vascular structure, show that it is related to ferns that flourished in Permian times. Thus, "the favourite of our gardens and even of our homes, is one of the most venerable of living plants; a member of the Palæozoic aristocracy."

The *Hymenophyllaceæ*, too, may be considered to have a Palæozoic origin. This, on first thought, is somewhat surprising, until it is remembered that the filmy character of the fronds is adaptive rather than fundamental, and until the more essential facts are considered, such as the high spore-output (which may reach over 500 in *Hymenophyllum*). This Order has no derivatives and may be looked upon as forming "a blind evolutionary branch."

The most ancient ferns nearly all produced their relatively large sporangia simultaneously and are grouped as the *Simplices*. During the Mezozoic Period, Professor Bower points out, "derivative forms arose, characterised generally by their smaller sporangia with lower individual spore-output; also by a "gradate" or "mixed" sequence of their production. The general constitution of the plants which bore these was more delicate, their conducting tracts more highly divided and the venation more complex, while dermal scales were substituted for hairs. These and other features marked the progression from Palæozoic types towards those of the present day." Finally, all modern ferns were segregated into six large groups. Each group centres round some well-known genus and are accordingly termed Davallioids, Pteroids, Gymnogrammoids, Blechnoids, Dryopteroids, and Dipteroids. The first and last of these have no representatives in Britain.

The ancestors of the Pteroid group are akin to the living genera *Dicksonia* and *Dennstaedtia* which have "marginal two-lipped sori showing basipetal sequence of their sporangia, borne on a receptacle which was actually marginal." In the Pteroids, "the sori have lost their individuality and are fused into a series which are still borne at or near to the margin of the leaf." It is pointed out that the Common Bracken, which was placed under *Pteris* by Linnaeus, does not really belong to that genus, which has a single-lipped sorus which is superficial, and with sporangia of different ages intermixed, with scales as a dermal covering. Our Bracken therefore should be *Pteridium aquilinum*, Gleditsch (1760). It is the only species of its genus and is of a distinctly more primitive type than the true members of the genus *Pteris*.

There is some difficulty in placing the Parsley Fern (*Cryptogramme crispa*), the Annual *Gymnogram* (*Anogramme* or *Gymnogramme leptophylla*), and the true Maidenhair (*Adiantum Capillus-Veneris*), but these are probably indirect descendants of the ancient stock of *Osmundaceæ*. These have sori which have, in all probability, been always superficial and unprotected, and the instability of the annulus, with a relatively thick stalk, confirms their relationship with some more massive stock. The genus *Woodsia* is of considerable interest. In spite of the small size of our British species, the essential characters shown in the fimbriated cup-like indusium, bearing a receptacle with gradate sporangia, show their affinity with the giant Tree Ferns of *Cyathea* and *Alsophila*. In origin, the *Woodsias* are earlier than the Dryopteroids or Blechnoids.

The Bladder Ferns (*Cystopteris*) are puzzling, and the problem is as yet unsolved whether their ancestry was Pteroid with marginal, or Cyatheoid with superficial sori. Professor Bower leans to the view that, like *Woodsia*, *Cystopteris* was probably derived from some Cyatheoid source.

The Dryopteroid Ferns, with which *Cystopteris* is closely related, are well represented in our British Flora by the

genera *Dryopteris*, *Polystichum*, *Athyrium*, *Asplenium*, and *Ceterach*, which differ from one another in the form of the sorus and indusium rather than in their anatomy or morphology. It is considered that all the Dryopteroid group had the Cyatheoids as their starting point. Professor Bower pointed out that the genus *Dryopteris* has a lop-sided sorus and, judging from the fact that it contains over 700 species, is evidently a biological success. It was also remarked that our familiar Oak and Beech Ferns, which were originally placed under *Polypodium*, are essentially Dryopteroid in habit and leaf character. The indusium is absent merely because it is abortive.

“ In the evolution of Ferns of this Dryopteroid affinity,” says Professor Bower, “ the sorus, and especially its indusium, have proved very plastic ; they appear as evolutionary playthings.” He continues by remarking that the receptacle may become lop-sided and that the indusium may be reduced or even abortive. In the genus *Polystichum*, “ the indusium is shuttlecock-shaped and apparently distal on the receptacle, and is seemingly very different from the basal cup of *Cyathea*. But through the intermediate state of *Dryopteris* it is easy to see how this may have come about, first by lop-sidedness of the sorus, then by a continuation of the sporangial production all round the indusial stalk, instead of only on one side of it as in *Dryopteris* itself.” An accentuation of the lop-sidedness of the sorus leads through *Athyrium* to *Asplenium*, and finally with abortion of the indusium to *Ceterach* and to “ Pseudo-athyrium.” The basal sorus in *Athyrium* often resembles the kidney-shaped sorus of *Dryopteris*, but not equally developed on its two sides. The foreign species, *Asplenium lanceum*, was mentioned as having sori which varied from that of *Dryopteris* to that of *Asplenium* with intermediate forms. Our Lady Fern has now been reinstated in its old genus *Athyrium* Roth., while the Alpine Polypody, formerly called *Polypodium alpestre* by Hoppe, and *Pseudo-Athyrium alpestre* by Newman, should now naturally appear as

Athyrium alpestre, in spite of the absence of indusium. Professor Bower remarks that "this is a good example of how rigid observance of a mistaken systematic method may disguise true affinity, and lead to groupings that illustrate the ingenuity of the systematist rather than true relationship." In the *Synopsis Filicum*, the Alpine Polypody is separated by over eighty pages from its natural relative, the Lady Fern !

The Scaly Spleenwort is our only species of a small genus allied to *Asplenium*. The indusium, aborted or absent, and the venation, together with the scaly covering of the leaves, have justified the formation of a separate genus, *Ceterach*. All the ferns of the Asplenoid alliance are considered to be derivatives from a Dryopteroid, and ultimately from a Cyatheoid source.

There still remain two British Ferns of probable Cyatheoid derivation. These are the Hard Fern (*Blechnum spicant*) and the Hart's Tongue (*Phyllitis Scolopendrium*). The Hart's Tongue has usually been considered as allied with the Spleenworts, but Professor Bower proves that it is more probably derived from the Hard Fern. The Blechnoids are mainly tropical and even Southern ferns, and our native species is a very isolated type, the only species of North Temperate Lands. The common feature of the Blechnoids, it is pointed out, is that two linear fusion-sori take a parallel course, one on either side of the midrib and well within the margin, with a vascular commissure running below the common receptacle of each. The Hart's Tongue, *Phyllitis*, has its paired fusion-sori facing one another, each with a vascular strand below its receptacle. A connecting link, giving the key to the puzzle, is found in the South African species, *Blechnum punctulatum*, in which "the fusion-sori do not run in straight longitudinal lines but are thrown into sinuous curves on the widening leaf ; and these are liable to interruption at the points of sharpest curvature, with the result that the isolated parts face one another just as they do in *Phyllitis*." It is further pointed out that the paired

sori of *Diplazium* (the Asplenoid genus with which *Phyllitis* has been compared) lie back to back and not face to face as in the Hart's Tongue, with which therefore it cannot be allied.

The Lecturer then dealt with the interesting problem of our Common Polypody, *Polypodium vulgare*, L., pointing out that it is the only true species of this genus in Europe, and that a fern cannot be indiscriminately included under *Polypodium* merely because it has naked rounded sori. The other British species formerly grouped in this genus have been shown to have other affinities. "The definition," said Professor Bower, "implies merely a state or condition that may have been arrived at along a plurality of lines of descent. In particular, some may have had naked sori throughout their evolutionary story; others may have sori that have become naked through abortion of the indusium. This is undoubtedly the history of the Oak and Beech Ferns, and of the Alpine Polypody, which find their natural places either with *Dryopteris* or with *Athyrium*." The Common Polypody, however, shows no suggestion of an abortive indusium and has probably always had a naked sorus. In classification it has usually been put under the sub-genus *Eu-Polypodium*. Quite recently, however, the researches of Dr. Carl Christensen have shown that it belongs rather to the sub-genus *Goniophlebium*. "By comparison of allied species, both from America and from Asia, Christensen has found successive steps of linking of the veins into loops characteristic of the tropical sub-genus *Goniophlebium* and he draws the conclusion that *P. vulgare* is a free-veined *Goniophlebium* and not a member of the sub-genus *Eu-Polypodium* as commonly accepted." This isolated European species, our Common Polypody, is therefore looked upon as an extreme outlier of the tropical group.

The Pill-Wort (*Pilularia globulifera*, L.) is not usually thought of when Ferns are under consideration, but Professor Bower dealt with it in his lecture. It is the only British representative of the Hydropterids, and has distinct male and

female sporangia, and is semi-aquatic in its habits. In spite of its unfernlike appearance, it is considered to have an ultimate affinity with the *Schizæaceæ*, a family of Ferns which date back to early Mesozoic times.

In concluding his most interesting and instructive lecture, Professor Bower pointed out that our present-day British Fern Flora contained an unusual proportion of species, such as the Moonwort, the Adder's Tongue, the Royal, Killarney and Parsley Ferns, which belong to the more ancient families. Most of the eight main groups of living Ferns are represented, but not all of them. The Davallioid and Dipteroid Ferns are without representatives, although the Common Polypody may perhaps be linked to the latter through *Goniophlebium*. Our forty British species are representative of half of the twelve families of the World Flora. This is, the Lecturer said, probably a consequence of the position of Britain on the extreme fringe of a great continental area. A large proportion of our native species "occur as isolated types of Families much more extensively represented in other regions." The Moonwort, the Adder's Tongue, the Royal Fern, the Killarney Fern, the Bracken, the Parsley Fern, the Maidenhair, the Hard Fern, the Common Polypody and the Pill-Wort are each the only representatives of their respective genera, which elsewhere may contain numerous species. The question arises "whether our isolated species are, geographically speaking, feelers that have edged their way northwards, or laggards left behind when the rest of the allied species had retreated southwards, or had died out." It was thought that the latter alternative was the correct one. That is "that they represent vestiges of a richer Flora of the past, and that the species themselves have, by their more ready adaptation or by more hardy constitution, been able to subsist in surroundings from which their congeners have retired beaten. In fact, that they symbolize the tenacious and adaptable race of men that inhabit these Islands."

S. P. ROWLANDS.

TEICHOBIA VERHUELLELLA, A NEW FERN PEST.

On the Society's excursions around Axminster in 1924 Mr. Sheldon found a large-growing lobed form of *Asplenium trichomanes* plants of which he gave to several members. It was afterwards found that some of these ferns were infested by a small grub which burrowed under the sori and made itself coverings from the sporangia and spores. In Mr. Henwood's collection, among others, this grub spread to other species and genera including *Polystichums*, *Lastreas*, and fertile forms of *Polypodium vulgare*. It is only this year that the perfect insect has been captured by placing the infested fronds in covered glass jars during the winter until the fly hatched out. It turns out to be a very small moth of the family Tineideæ and has been identified by Mr. J. C. F. Fryer, the expert of the Plant Pathological Laboratory of the Ministry of Agriculture, as *Teichobia verhuellella*, a species which is known to feed upon the fructification of ferns in the West of England, but which has not hitherto been reported upon ferns under cultivation. The small size of the caterpillar renders it difficult of detection, while the covering of spores, etc., serves as a protection against watery insecticides which are repelled by the dust-like surface. It can be destroyed, however, by touching the masses of collected spores with a small brush dipped in methylated spirit, which liquid is quickly absorbed by the spore heaps and kills the tiny caterpillar.

F.W.S.

ATHYRIUM F.F. FIMBRIATO-CRISTATUM, GARNETT.

This fern was raised as a sporeling by the late Mr. Garnett, of Windermere, its parentage being unknown. It was exhibited at the Annual Meeting at Bowness in August, 1899, Mr. C. T. Druery being in the Chair, and was officially named as above. It was noted at the time that it showed promise of apospory though this could not be immediately demonstrated. When the Society's "Book of British Ferns" was published

in 1902 the name of this fern appeared in the list of varieties with the note : " A lax and charming *cristatum* : very distinct." Some years later, however, when Mr. Druery published his " British Ferns and their varieties " (Routledge) he appears to have altered the name, on his own responsibility, to " *A. f.f. Clarissima cristatum*," and this change has led to some confusion with regard to the history and identity of the fern. As it has no connection with the original *Clarissima* of Colonel Jones beyond the accidental resemblance in the matter of apospory and cutting, we think the later name should be dropped and the original one restored. It is a very beautiful fern having small and narrow pinnulets and a drooping lacelike fringe of cresting around the frond, which character gives the plant a very elegant pendulous outline. As it has never produced spores and does not appear to have been reproduced by apospory it is still a rare plant and is, at present, in but few collections. We are indebted to our President, Mr. W. B. Cranfield, for a division and to Mr. W. Wilson, of Kendal, for valuable help in clearing up the history of the variety.

F.W.S.

FERN PLANTING AT THE STAFFORDSHIRE NATURE RESERVE.

In the *Gazette* for June, 1928, an appeal was made for gifts of surplus Ferns for the Staffordshire Nature Reserve at Hawksmoor. The Reserve lies on high, well-wooded ground in some of the finest scenery in the county, and has a superficial area of 200 acres ; but actually the acreage is probably nearly 400, as there are valleys and small hills to be taken into account. In September, 1928, a small party, including the writer, met there to plant out a number of Fern species. Some thirty species have been recorded for Staffordshire, of which several are now counted as extinct and most are rare : those planted were from this list, though " difficult " Ferns such as *Botrychium lunaria* were left out.

The morning was spent in a small valley at the "head" of the Reserve, finding homes for some *Aspleniums*, *viride*, *trichomanes*, *ruta-muraria*, *Adiantum-nigrum*, *Ceterach officinarum*, *Cystopteris fragilis*, *Blechnum spicant* and *Polypodium vulgare*. At the higher end of this valley, on the rising ground at each side, big masses of damp rock stand out prominently: and in the crevices and at the foot of these the planting was done. It is hoped that excavation may be carried out here down the slopes, thus laying bare more rock and perhaps inducing a flow of the water which now oozes away into the soil.

Already kestrels roost on one rock-ledge and it is thought that in ruder surroundings (such as excavation would ensure) they may feel inclined to nest.

The walk back to the keeper's cottage was varied to bring in a large patch of Bracken, most luxuriant, with fronds frequently more than normally divided.

Meanwhile the keeper had taken a hamper full of Ferns to the very heart of the Reserve, where a spot intentionally secluded had previously been selected. This was thought necessary, as the vandal has already begun to appear. A fine *Scolopendrium* was put by a stream only a short time before, and was almost at once removed by "some person or persons unknown." It is true that to put a Hart's Tongue in full public view is asking for trouble, in the Midlands: this species has an irresistible fascination, and in a collection will be the only one picked out for any remark. A search was made, but only the usual *Lastreas* (*f.-mas* and *dilatata*) were seen on the way to the chosen place. Here a small pool has been made and by it *Osmundas*, *Scolopendriums*, *Athyriums* (superfluously), *Lastreas montana* and *Thelypteris* were set; two or three of each, except *Osmunda*, of which there were six or seven.

From the pool a little stream trickles away down a slope amongst small trees, and beside it *Polystichums*, *Lastreas* (*f.-mas*, *æmula* and *spinulosa*) were put; also *Polypodium*

dryopteris : with *P. phegopteris* near by. *P. calcareum* was also planted, but its future is doubtful ; it was, however, included although only once recorded, many years ago. It will be of interest to know that nearly all these plants came from Sale, and that their fine condition was universally admired.

While busy, a sensation occurred on the discovery of a fine specimen of *L. f.-mas cristata*, apparently wild. Hopes of a " find " (a frond of which was sent to and confirmed by Dr. Stansfield) ran high for a time. Later it was learnt that the keeper had put it there without saying anything : a friend gave it to him from his garden, having " had it for a long time, but not knowing where it came from." As it was sporiferous, it may increase.

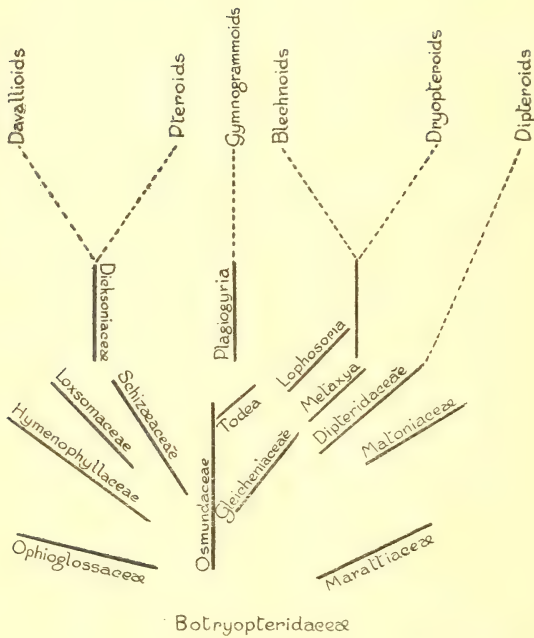
After the planting was done, two or three fine old specimens of *Lastrea montana* were seen. This Fern seems to occur in very small colonies in the county. The writer has seen it only once elsewhere in Staffordshire, in a wood near his home, and there also only two plants were found, growing side by side. They were considered to be natives, as if introduced it is almost certain that many more would have been planted. Close by (at Hawksmoor) is a large patch of *Blechnum*, grand, well-established plants with barren fronds often a foot long. Not one fertile frond was found, after a very careful search, and yet fifty yards away a long low bank was dotted with young plants, all facing the patch further down the slope. However, this is outside the scope of the expedition. Some success may be expected, but much remains to be done, both in further planting and in investigating the whole area with a view to making a real " census " of its Ferns.

E. A. ELLIOT.

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PHYLETIC SCHEME FOR THE MORE PRIMITIVE FILICALES

(Prof. Bower, F.R.S. "The Ferns (Filicales)" Vol. II, p. 333)

THE BRITISH PTERIDOLOGICAL SOCIETY

THE SOCIETY originated, in September 1891, in the Lake District with headquarters at Kendal. Its members were, however, distributed throughout Great Britain and Ireland, whilst some few reside in the Dominions and U.S.A. Its declared objects were :—

- (i) The Study of Species and Varieties of British Ferns ;
- (ii) The Recording of Information with regard to Ferns generally.

The British Fern Gazette was established in September 1909, publication being quarterly until the commencement of the war. After the war publication was restricted to two issues per annum on account of the increased cost of printing and the decrease in the number of members. It is hoped shortly to resume quarterly publication.

Members are invited to communicate with the Hon. Secretary on subjects of interest with regard to British Ferns.

Certificates are awarded to new ferns of distinction of which plants or characteristic fronds are shown at the Annual Meeting for adjudication. The Annual Meeting is held usually in August or September, at some place where ferns are abundant and from which excursions for fern hunting can conveniently be arranged. These excursions are an important feature of the Society's activity.

Fronds may be sent to the Hon. Secretary to be identified or named at any time.

Recently a Sub-Committee of the Society undertook the correct naming of the National Collection at Kew and, in conference with the Director and staff, planned and arranged the present fernery, supplementing the collection with gifts of plants from the ferneries of some of the members.

The collection in the Royal Horticultural Society's Garden at Wisley was similarly dealt with and augmented.

The Society is affiliated to the Royal Horticultural Society, which is also an individual subscriber to its funds.

The Committee is endeavouring to increase the membership of the Society and, through this and by other means, to encourage the more general cultivation of the varieties of British ferns. Any lover of horticulture is eligible for membership and the subscription is 10s. per annum (due in advance at or immediately after the Annual Meeting), which entitles members to copies of *The Gazette*.

The Hon. Treasurer or Hon. Secretary will be pleased to supply members who may desire it with Bankers' Orders for the convenient payment of subscriptions.

Further particulars may be obtained from the Hon. Secretary,

F. W. STANSFIELD, M.D., F.L.S.,
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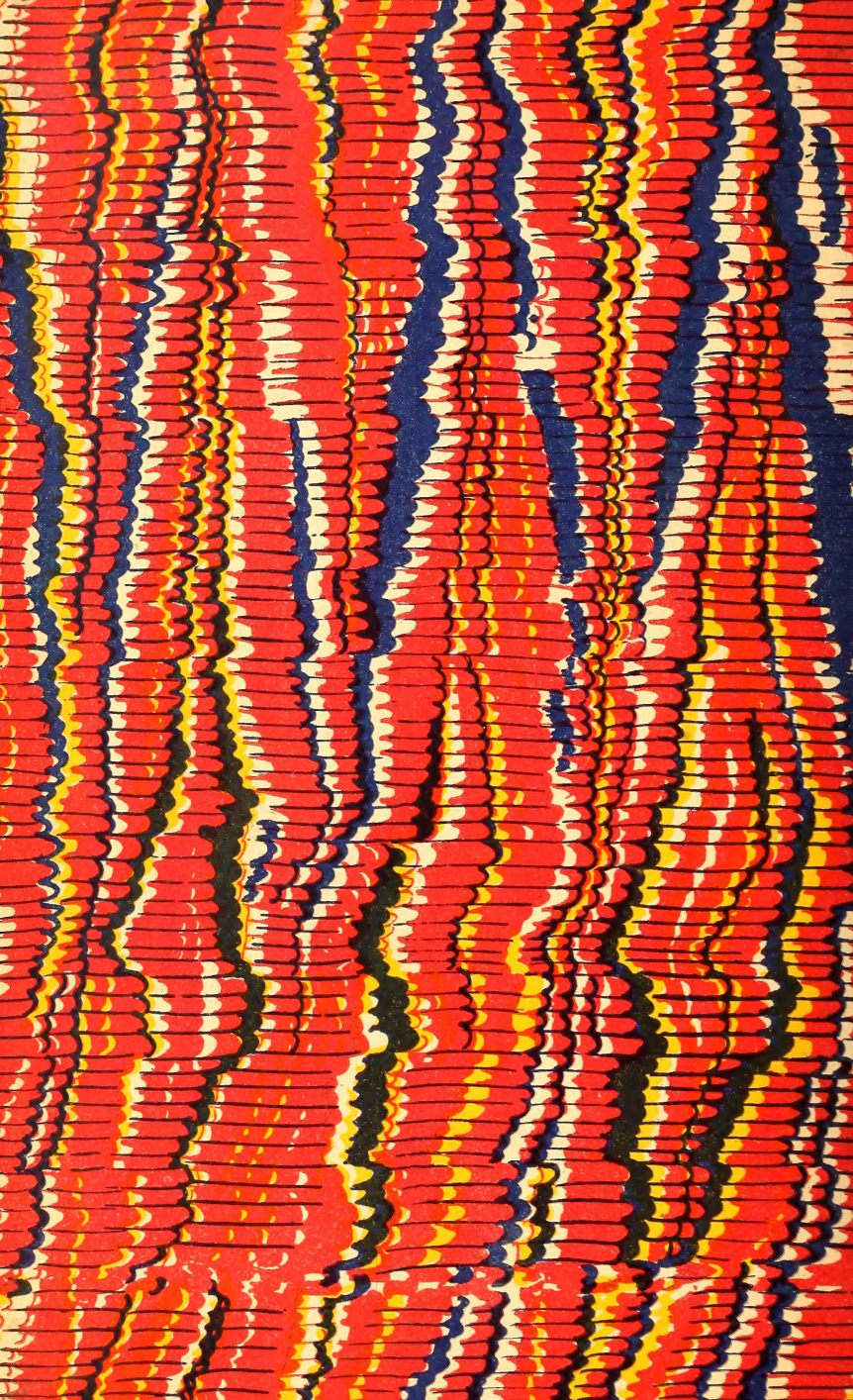
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